

Service Manual

• KEH-M5002SDK/WG



ORDER NO.
CRT1370

MULTI-CD CONTROL FM/MW/LW TUNER AMPLIFIER

KEH-M5002SDK

WG

KEH-M5002B EW

Note:

- See the service manual CX-175 (CRT1276) for the cassette mechanism description.

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SPECIFICATIONS

General

Power source	14.4 V DC (10.8 — 15.6 V allowable)
Grounding system	Negative type
Max. current consumption	7.5 A
Dimensions (chassis)	180(W) x 50(H) x 150(D) mm
(front face)	188(W) x 58(H) x 12(D) mm
Weight	1.6 kg
Amplifier	
Maximum power output	25 W x 4 (EIAJ)
Continuous power output	13 W x 4 (1 % dist. at 1 kHz)
Load impedance	4 Ω (4 — 8 Ω allowable)
Nominal output level/ output impedance (pre out)	500 mV/1 kΩ
Tone controls (bass)	±10 dB (100 Hz)
(treble)	±10 dB (10 kHz)
Loudness contour	+12 dB (100 Hz), +7 dB (10 kHz) (volume: —30 dB)
Tape player	
Tape	Compact cassette tape (C-30 — C-90)
Tape speed	4.76 cm/sec. (+0.14 cm/sec., —0.05 cm/sec.)
Fast forward/rewind time	Approx. 100 sec. for C-60
Wow & flutter	0.08 % (WRMS)
Frequency response	Metal: 30 — 19,000 Hz (±3 dB)
Stereo separation	45 dB
Signal-to-noise ratio	Metal: Dolby B NR IN: 66 dB (IEC-A network) Dolby NR OUT: 60 dB (IEC-A network)

FM tuner

Frequency range	87.5 — 108 MHz
Usable sensitivity	11 dBf (1.0 μV/75 Ω, mono)
50 dB quieting sensitivity	16 dBf (1.7 μV/75 Ω, mono)
Signal-to-noise ratio	70 dB (IEC-A network)
Distortion	0.3 % (at 65 dBf, 1kHz, stereo)
Frequency response	30 — 15,000 Hz (±3 dB)
Stereo separation	40 dB (at 65 dBf, 1kHz)

MW tuner

Frequency range	531 — 1,602 kHz
Usable sensitivity	18 μV (25 dB) (S/N: 20 dB)
Selectivity	50 dB (±9 kHz)

LW tuner

Frequency range	153 — 281 kHz
Usable sensitivity	30 μV (30 dB) (S/N: 20 dB)
Selectivity	50 dB (±9 kHz)

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

• Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

• Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.

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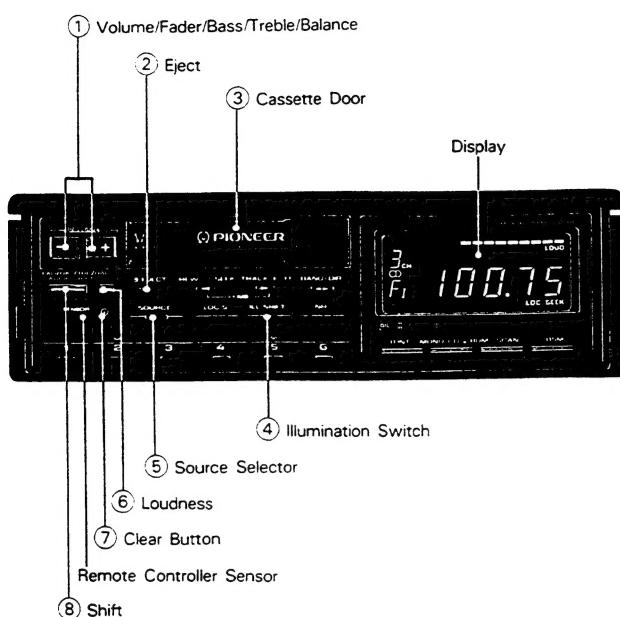
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1. ADJUSTING VOLUME AND TONE



Using the Clear Button

Once all wiring is complete, press Button ⑦ with a thin, pointed object. Though not a normal occurrence, the microprocessor which controls the operation of this unit can be affected by electrostatic noise. This generally is indicated by such symptoms as no power being supplied when you switch the unit on, failure of buttons and controls, or an abnormal display. Should this happen, press Button ⑦ with a thin, pointed object to reset the microprocessor. Note that doing so also resets all audio controls, so you will have to make any desired settings again. This operation deletes all memory contents, such as frequencies stored in the preset memory, so you will have to make any desired settings again.

Switching Power On

Radio

Press Button ⑤ to switch the tuner power on. Press Button ⑤ again to switch the power off.

Tape

Insert the cassette tape through the Cassette Door ③, and the power will be automatically turned on to get the tape start being played back. To eject the tape, press the button ②.

- You will hear a few consecutive clicks from your unit when you have started the engine with the cassette tape inserted or when you have again mounted your unit on the Quick Release Mounting Bracket following dismounting. The sounds are only the sign of your unit's mechanical preparation being made, but does not indicate at all its functional failure.

Changing the Source

When the cassette tape is inserted, the source changes at each press of the button ⑤: Tape → Radio → OFF. When a Multi-Play CD player—optionally available Multi-Play CD Player CDX-M50, for example—is connected to your unit, the source changes: Multi-Play CD Player → Tape → Radio → OFF.

Adjusting Volume/Fader/Bass/Treble/Balance

To adjust volume, press the button ①. The display changes at each press of the button ⑧: Volume → Fader → Bass → Treble → Balance. Press the button ① to adjust the displayed mode.

Adjusting Volume

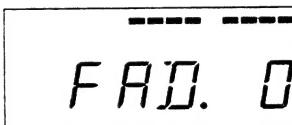
Pressing the (+) side of Button ① increases the volume, while the (-) side decreases it.



Adjusting the Fader

This function controls the balance between the front and rear speakers of a 4-speaker system. Pressing the (-) side of Button ① shifts the balance to the front speakers, while the (+) side shifts it to the rear speakers.

In the case of a 2-speaker system, set the display to "FAD.O". (In the case of a 4-speaker system the fader adjusts the balance between the front and rear pairs of speakers.) In the case of a 6-speaker system (4 speakers connected to this unit and 2 speakers connected to an external power amplifier connected to Pre-out), the front-rear balance is between the 2 front speakers and the rest.



Adjusting Bass

Pressing the (+) side of Button ① increases bass, while the (-) side decreases bass.



Adjusting Treble

Pressing the (+) side of Button ① increases treble, while the (-) side decreases treble.



Adjusting Balance

Pressing the (-) side of Button ① shifts the balance to the left speaker, while the (+) side shifts it to the right speaker.



- When you're adjusting fader, bass, treble or balance settings, the indicator will stop at the center setting. About 5 seconds after adjustment has been made, the display returns to its previous state.

Using the Loudness Function

Press Button ⑥ and the "LOUD" indicator will appear on the display. This "loudness" function enhances both the high and low ranges of sound to give even more power to output even at low volumes.

Switching Illumination Color

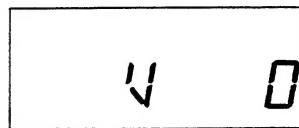
Press Button ④ to switch illumination color between green and amber. Pressing Clear Button ⑦ causes the illumination to be turned green.

Using Source Level Adjustor

You may wish to adjust volume when you have changed the source to radio, tape, or CD or when you have changed the radio band from FM to MW/LW. You can do so on the basis of the volume of FM as follows:

1. Use the button ⑤ to change the source. (In case of radio, change the band to MW/LW.)

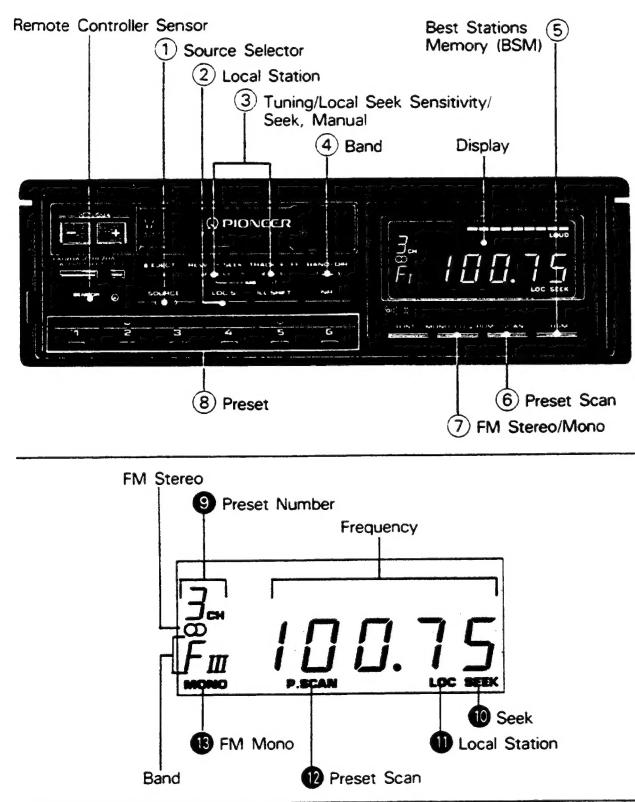
2. Hold down the button ⑧ for about 2 seconds, and the display will show you the volume of the source.



3. To increase the volume, press the (+) side of the button ①, and to decrease press the (-) side. You can adjust the volume within a span of V-4 and V+4. The display automatically returns to the previous showing when five seconds have elapsed after the adjustment.

- No adjustment can be made when an FM station is tuned in.

2. USING THE RADIO



1 Press Button ① to switch the radio power on.

2 Press Button ④ to select a band.

$F_1 \rightarrow F_2 \rightarrow F_3 \rightarrow M/L$
(FM1) (FM2) (FM3) (MW/LW)

Use Button ③ to switch between MW (531—1,602 kHz) and LW (153—281 kHz).

3 Use seek tuning to tune in a frequency.

Confirm that the SEEK indicator ⑩ is shown on the display (if not, press the (+) and (-) sides of Button ③ at the same time). Press the (+) side of Button ③ to automatically tune in the next higher receivable frequency, and the (-) side for a lower frequency.

4 Adjust volume and tone (see page 2).

5 Assign the tuned frequency to one of the buttons in Bank ⑧ (preset memory).

Press and hold down one of the buttons in Bank ⑧ for at least two seconds. The frequency is assigned to the selected button when the preset number ⑨ stops flashing on the display. Up to 18 FM stations (6 each for FM1, FM2 and FM3), and six MW/LW stations can be assigned to the preset memory buttons in Bank ⑧.

6 Once a frequency is assigned to a button in Bank ⑧, you just need to press that button to tune it in.

This also causes the number of the button pressed to appear at Position ⑨ on the display.

Preset Scan Tuning

This function lets you automatically monitor the stations assigned to the preset buttons.

1. Press the button ⑥, and "P.SCAN" ⑫ will light up and the preset number ⑨ flash.

Each station assigned to the buttons in Bank ⑧ will be automatically tuned in for about eight seconds.

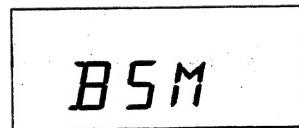
2. When you hear a station that you like, press Button ⑥ again to cancel preset scan tuning and remain at that station.

BSM (Best Stations Memory)

This function automatically locates stronger stations and automatically assigns their frequencies to the buttons in Bank ⑧, from strongest to weakest. It comes in handy when trying to find local stations while driving.

1. Press Button ④ and select a band.

2. Hold down Button ⑤. After about two seconds, a "beep" will sound to signal that the BSM search has started. At this time, "BSM" will flash on the display.



3. The frequency display will return once BSM search is complete, and frequencies are assigned to buttons 1 through 6 in Bank ⑧.
- At the end of the BSM search, the displayed frequency is that assigned to Button ① of Bank ⑧.
 - If there are fewer than six strong stations in the area, some of the buttons in Bank ⑧ will not be assigned frequencies, so they will retain any frequencies assigned to them previously.
 - BSM search may take as long as 30 seconds in areas where there are few strong stations.
 - You can cancel BSM search by pressing Button ④.

Manual Tuning

Use manual tuning when stations are too weak to be picked up by seek tuning.

1. Press both (+) and (-) sides of Button ③ at the same time to clear "SEEK" ⑩.
2. Each press of the (+) side of Button ③ increases the frequency in 50 kHz steps in the FM band, 9 kHz in the MW band and 1 kHz in the LW band. Pressing the (-) side of Button ③ decreases the frequency. Holding down either side of Button ③ changes the frequency at high speed.

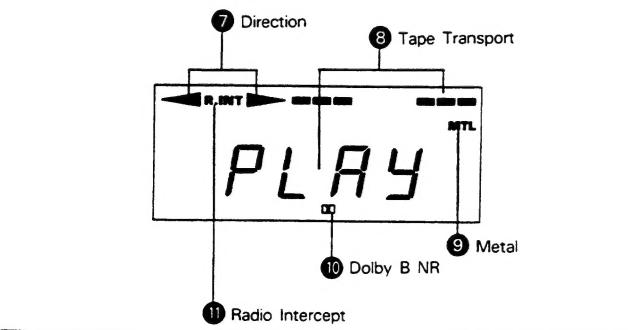
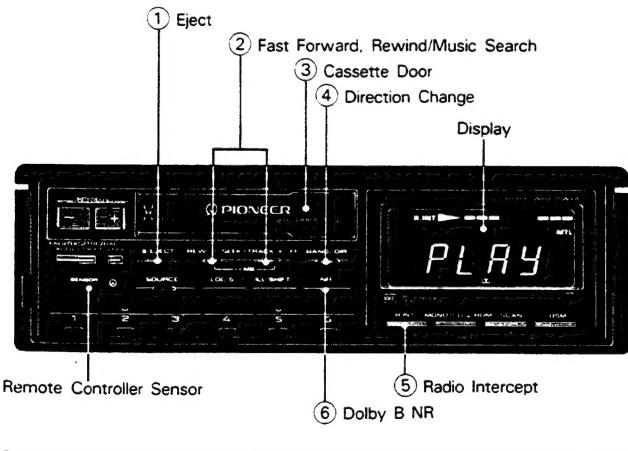
Switching between FM Stereo and Mono

Generally, it is best to allow the ARC (Automatic Reception Control) function to automatically set the optimum listening conditions. When there is a large amount of noise, you can press Button ⑦ for clearer mono reception ("MONO" ⑬ will appear on the display).

Adjusting Seek Sensitivity

The seek tuning function of this tuner lets you select between a local setting for reception of strong stations only, and a DX (distant) setting for reception of weaker stations. The local setting also has four seek tuning sensitivity levels for FM and two levels for MW/LW to match local conditions.

3. USING THE TAPE DECK



Changing the Local Seek Sensitivity

1. Use Button ④ to select a band.
2. Hold down the button ② for more than two seconds, and the display will show you the current local seek sensitivity for about five seconds.



(Example: LOC-2)

3. While the local seek sensitivity remains on the display, press the (+) side of Button ③ to increase the sensitivity level, and the (-) side to decrease the level as shown below.
FM : LOC-1 → LOC-2 → LOC-3 → LOC-4
MW/LW: LOC-1 → LOC-2
- The LOC-4 setting allows reception of only the strongest stations, while lower settings let you receive progressively weaker stations.
- The display of local seek sensitivity returns to the frequency when about five seconds have elapsed after the change of sensitivity.

Switching between Local and DX

Press Button ② to switch between Local and DX (distant) seek tuning.

When "LOC" ⑪ is shown on the display, seek tuning is performed with the local seek sensitivity. Otherwise, seek tuning is performed with the DX seek sensitivity.

- 1 Insert the cassette tape into the slot ③, and power will be turned on and the tape begin being played back.

At this time, the tape running indicator ⑧ and the tape running direction indicator ⑦ will light up.

- 2 Adjust volume and tone (see page 2)

- 3 To eject the cassette tape, press the button ①.

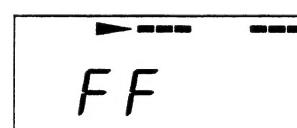
- Power is automatically turned off when the cassette tape has not been set within a few seconds. When this happens, remove the tape by pressing the button ① because of a possible trouble with the tape.
- A loose or warped label on a cassette tape may interfere with the eject mechanism of the unit or cause the cassette to become jammed in the unit. Avoid using such tapes or remove such labels from the cassette before attempting use.

Changing Program

Press the button ④ to change the side of tape from A to B or vice versa.

Using Fast Forward and Rewind

1. To forward tape fast, press the (+) side of the button ②.



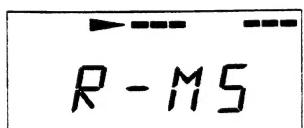
To rewind tape, press the (-) side.



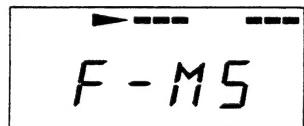
2. To release the Fast Forward or Rewind function, press the button ④.

Using Music Search

1. To repeat the current selection (A), press the (-) side of the button ② two consecutive times.



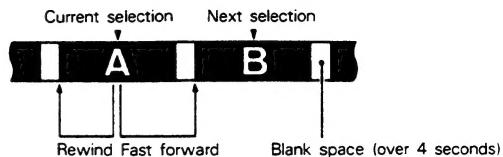
To hear the following piece of music (B) rather than continue the current selection, press the (+) side of the button ② two consecutive times. Pressing the button ② three consecutive times makes the normal sequence of playing resume.



2. To release the Music Search function, press the button ④.

The following errors will cause the music search function to operate improperly, even though the unit is not malfunctioning.

- Unrecorded "blank" portions between selections is less than 4 seconds → the blank portion cannot be detected by the unit.
- Pauses in recorded conversations are longer than 4 seconds → the unit reads these as blanks between selections.
- Portions are recorded at very low volume for more than 4 seconds → the unit reads these as blanks between selections.



Dolby B NR

To hear a tape recorded using a Dolby NR system, press the button ⑥. ("DOLBY" ⑩ appears).

Auto Tape Selector

When a cassette tape is inserted, the automatic tape selector determines the tape type, and switches between 70 µs and 120 µs equalization. When it is a metal or chrome tape, "MTL" ⑨ comes on. When it is a normal tape, nothing comes on.

Using Radio Intercept

Use Radio Intercept to hear radio while Fast Forward or Rewinding.

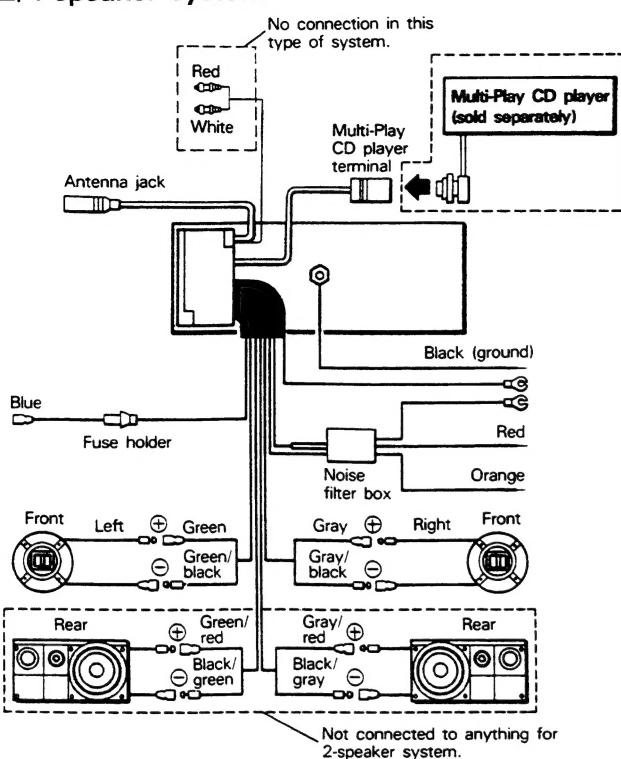
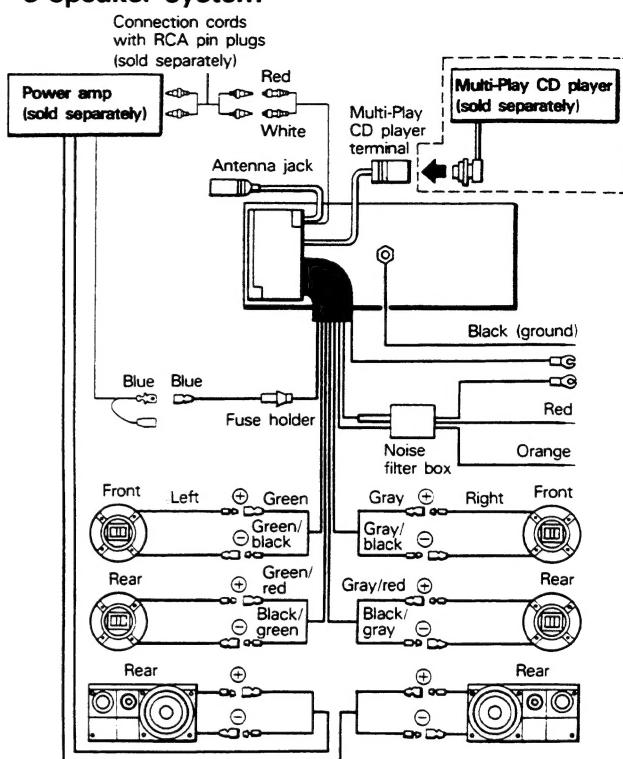
1. Press the button ⑤ ("R.INT" ⑪ appears) before Fast Forward or Rewinding, and you will hear radio.
 2. To release the Radio Intercept function, press the button ⑤ again.
- The Radio Intercept does not function when the Music Search is in operation.

4. CONNECTIONS

Note:

- To avoid shorts in the electrical system, be sure to disconnect the battery \ominus cable before beginning installation.
- Be sure to properly connect the color coded leads. Failure to do so can cause malfunctions.
- Be sure to connect the grounding lead to a metal part, such as the chassis of the car. If the lead is not connected properly, this unit will not operate at all.
- Since a unique BPTL circuit is employed, never wire so the speaker leads are directly grounded or the left and right speaker \ominus leads are common.
- Refer to the owner's manual for details on connecting the various cords of the power amp and other units, then make connections correctly.
- Speakers connected to this unit must be high-power type possessing maximum input of at least 25 W and impedance of 4 to 8 ohms. Connecting speakers with output and/or impedance values other than those noted here can damage the speakers.

- When the power amp is being linked with this system, be sure not to connect the blue lead to the amp's power terminal. Likewise, when linking this system with the auto-antenna, do not connect to power terminal for the antenna. Such connection can make overcurrent cause malfunctions.
- Be sure that the antenna cord and speaker cord are apart as far as possible from each other in order to prevent noise interruption. When this unit is connected to an optionally available Multi-Play CD player, such as CDX-M50, the connecting cord must also be as distant as possible from the antenna cord for the same purpose.

2/4-speaker system**6-speaker system**

Blue	If this unit is combined with a power amp, connect its blue lead to the blue lead (system control terminal) of the power amp. If combined with an auto-antenna, connect its blue lead to the relay control terminal of the auto-antenna. (MAX. 300 mA, 12 V DC)
Orange	To terminal always supplied with power regardless of ignition switch position.
Red	To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
Black (ground)	To vehicle (metal) body.

5. DISASSEMBLY

• Removing the Handle Assy

1. Remove the four screws.
2. Press the tabs at four locations indicated by arrows, and then pull out the handle assy.

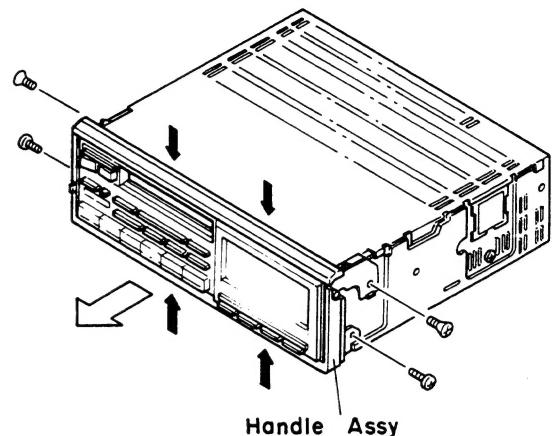


Fig. 1

• Removing the Case

1. Insert and turn a flat screwdriver to remove the case.
2. Raise the case to remove.

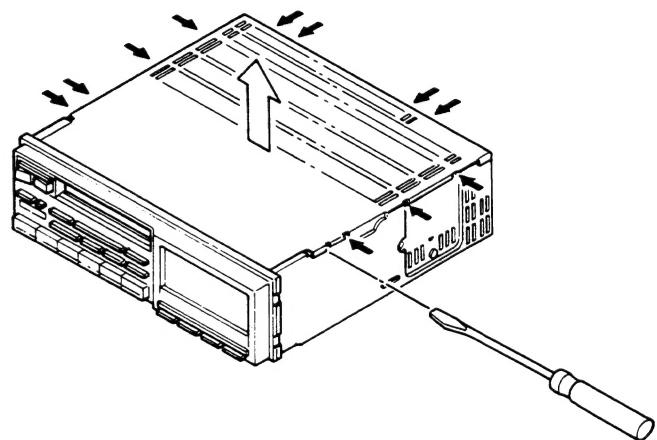


Fig. 2

• Removing the Cassette Mechanism Assy

1. Remove the four screws.
2. Disconnect the mechanism control unit connector.
3. Remove the cassette mechanism assy.

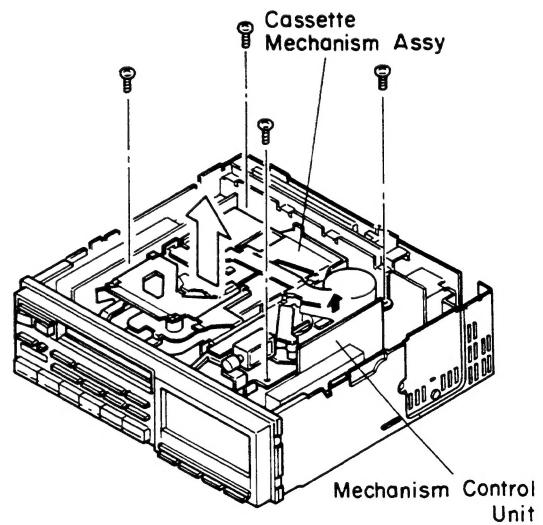


Fig. 3

• **Removing the Grille Assy**

1. Disconnect the two connectors.
2. Press the tabs at three locations indicated by arrows, and then pull out the grille assy.

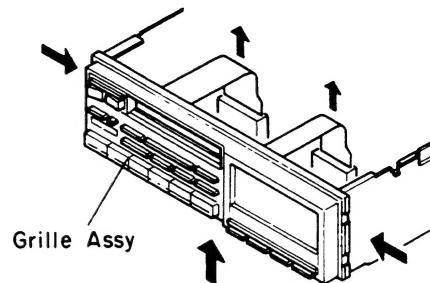


Fig. 4

• **Removing the Tuner Amp Unit**

1. Remove the five screws, and remove the cord assy.
2. Unbend the tabs at three locations indicated by arrows until straight.
3. Remove the solder indicated by arrow A.
4. Disconnect the connector.
5. Raise up on tuner amp unit to remove it from chassis unit.

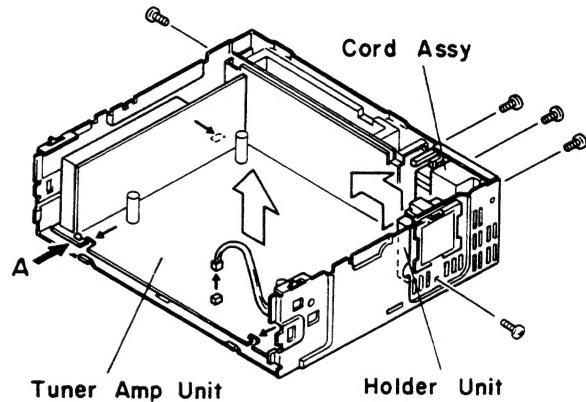


Fig. 5

• **Removing the Dolby NR P.C. Board, Amp P.C. Board and FM/AM Tuner Unit**

1. Remove the solder and unbend the tabs on back of each unit circuit board until straight.
2. Pull out unit as shown in illustration.

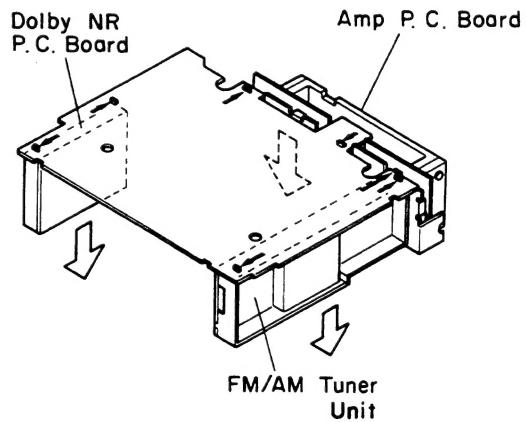


Fig. 6

• **Removing the Display Unit**

1. Remove the four screws.
2. Press the tabs at four locations indicated by arrows, and then pull out the display unit.

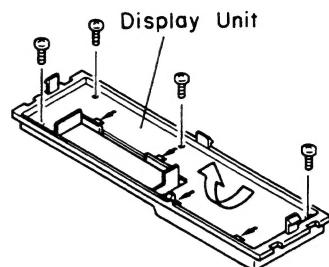


Fig. 7

6. REMOTE CONTROL ASSY (KEH-M5002B/EW)

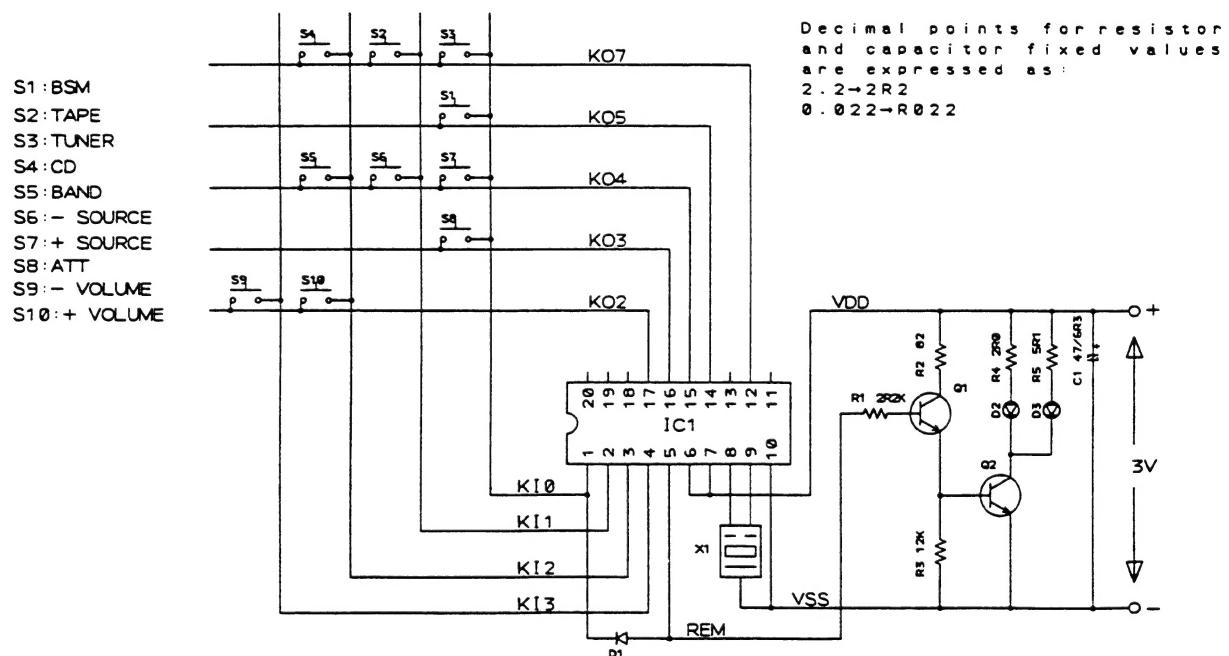


Fig. 8

7. ADJUSTMENT

- Connection Diagram

NOTICE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of SSG.

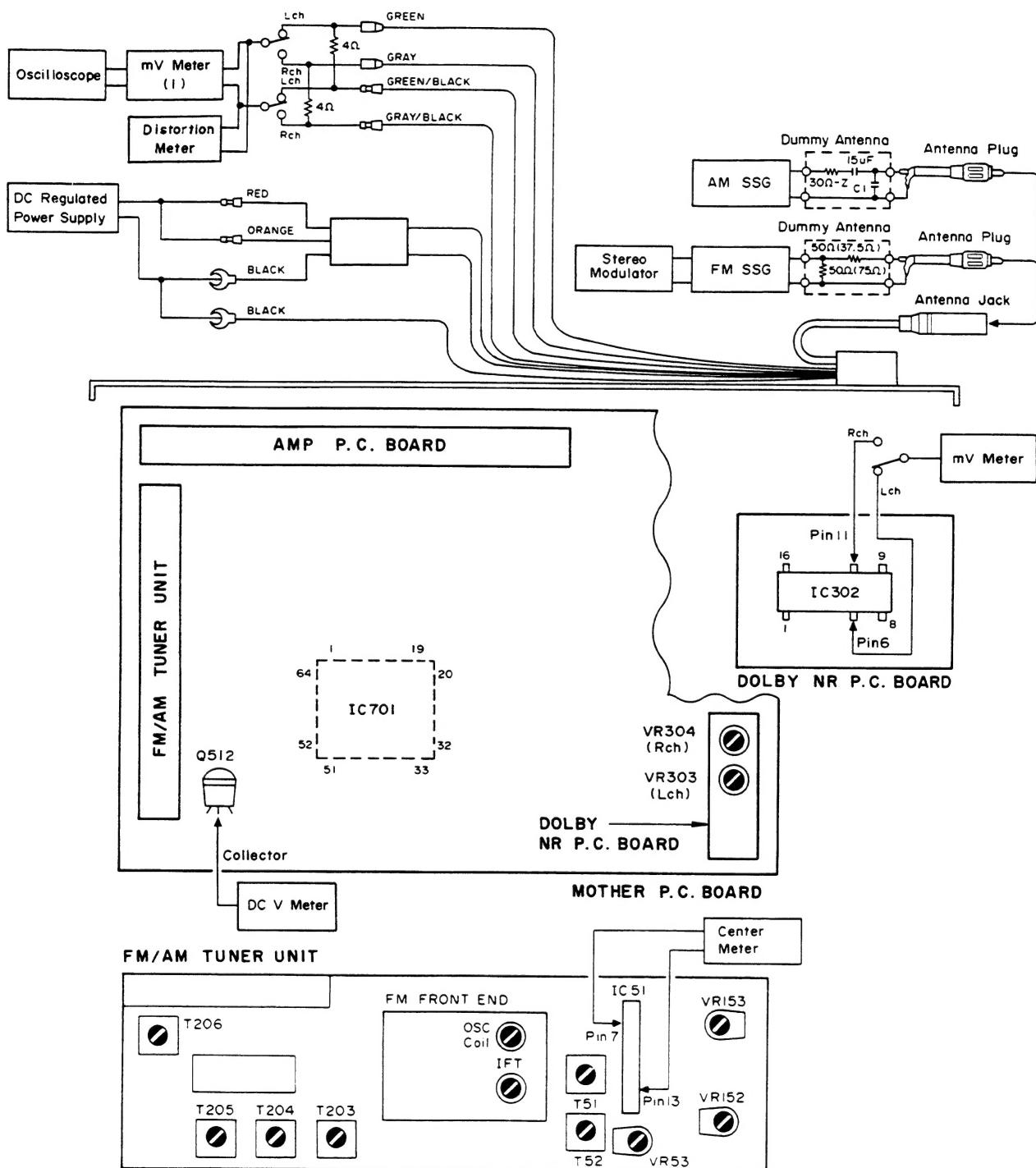


Fig. 9

DOLBY NR LEVEL ADJUSTMENT

No.	Cassette Tape	Adjusting Point	Adjustment Method (Switch Position)
1	NCT-150 (400Hz, 200nwb/m)	VR303 (Lch), VR304 (Rch)	mV Meter:-7.2dBs±1dB (DOLBY NR Switch:OFF)

MW/LW ADJUSTMENT

	No.	AM SSG (400Hz, 30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (kHz)	Level (dB μ V)			
Tun-ing Volt	1	(MW MODE)		1,602		Verify that DC V Meter (1) is less than 7.0V.
	2	(LW MODE)		153		Verify that DC V Meter (1) is more than 2.0V.
IF	1	999	20-25	999	T204, 205, 206	mV Meter (1) :Maximum

FM ADJUSTMENT ※ Stereo MOD.: 1kHz, L+R=90%, Pilot=10%

	No.	FM SSG (400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (MHz)	Level (dB μ V)			
Tun-ing Volt	1			108.0	OSC Coil (FM Front End)	DC V Meter:7.0V
IF	1	98.1	60	98.1	T51	Center Meter:0
	2	98.1	60	98.1	T52	Distortion Meter:Minimum
	3	Repeat No.1-2 alternately so that the center meter indicates the 0 output and distortion meter indicates minimum output.				
	4	98.1	5	98.1	IFT (FM Front End)	mV Meter (1) :Maximum
Mute	1	98.1	60	98.1		mV Meter (1) :A dB (This output is A)
	2	98.1	10	98.1	VR53	mV Meter (1) :A-3dB
ARC	1	98.1※	60	98.1	VR153	mV Meter (1) :Separation Maximum (Stereo Position)
	2	98.1※	35	98.1	VR152	mV Meter (1) :Separation 5dB (Stereo Position)

TEST MODE

Test mode is mainly used in adjustment of CD multi-players (such as CDX-M40, CDX-M50).

- Switching to test mode

While pressing the VOL +,- keys together, switch the back-up ON or release the clear button.

- Canceling test mode

Press the CD multi-player clear button, and then the KEH-M5002SDK, KEH-M5002B clear button. Or, switch the CD multi-player and KEH-M5002SDK, KEH-M5002B back-up OFF.

- Key functions during test mode

The CD multi-player, deck, and tuner are selected by the SOURCE key.

a) CD multi-player

Key	Function
BAND/REL	Regulator ON/OFF
FF	FWD kick
REW	REV kick
SCAN	Tracking close
MONO/CD	Tracking open
LOC. S	Focus close
FF+REW	Carriage/tracking switching

b) DECK

No corresponding function. Normal operation executed.

c) TUNER

During BSM operation, BSM is canceled when three station are detected. Other keys are used for normal operations.

- Flow Chart

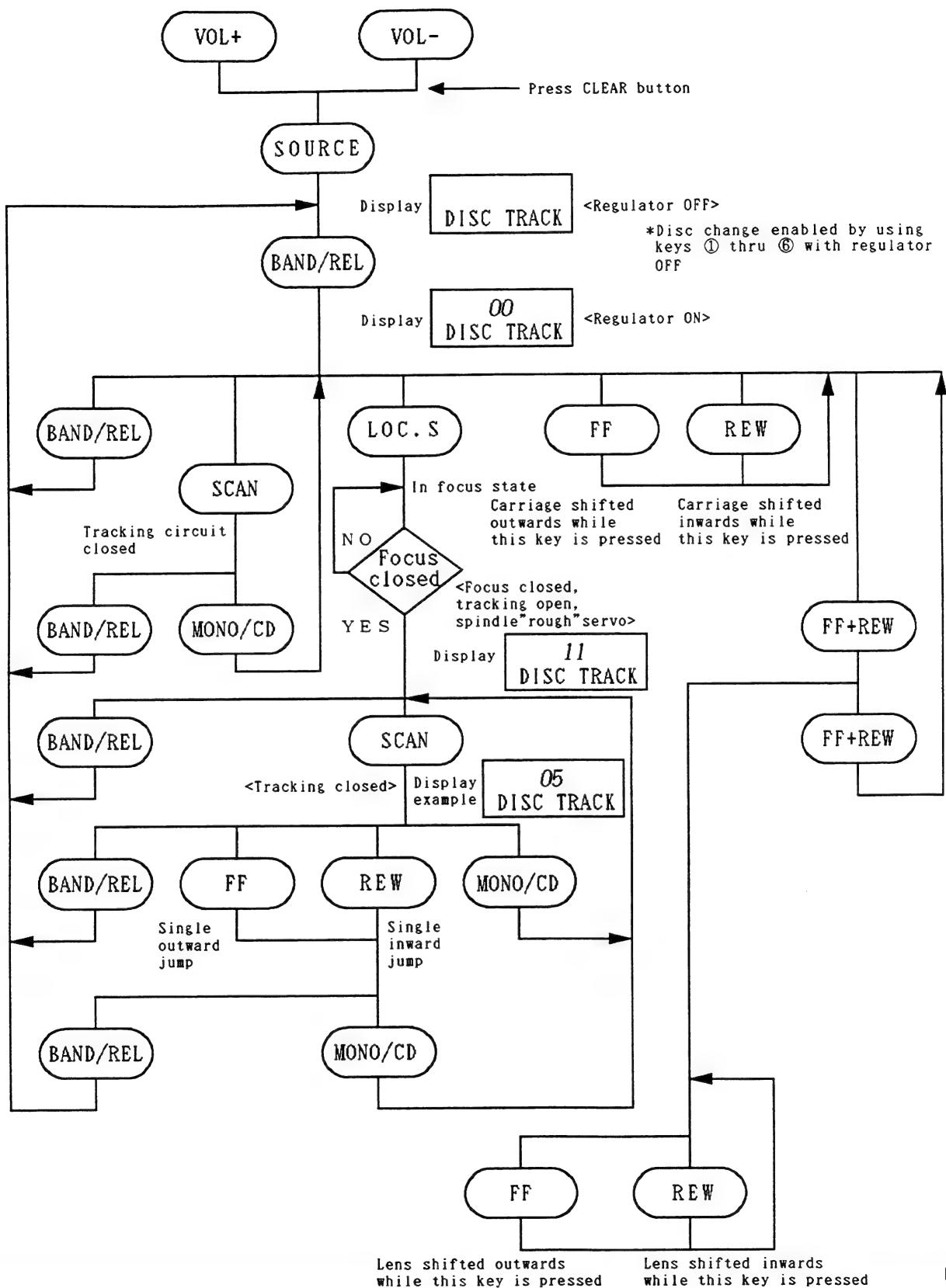
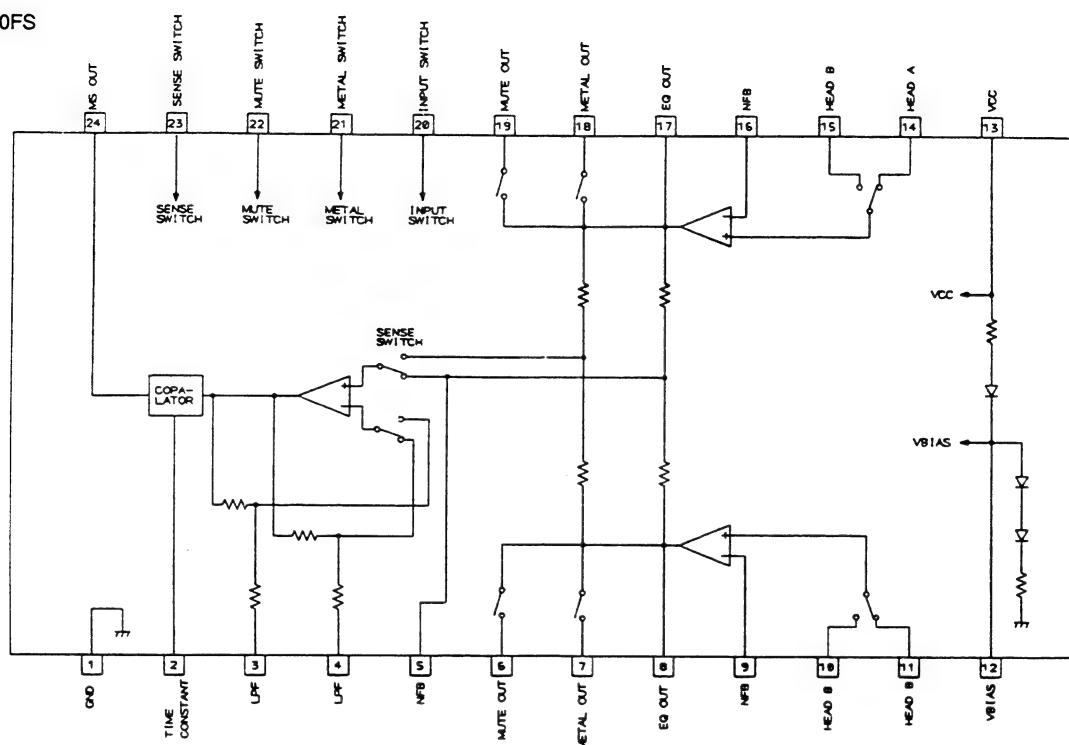


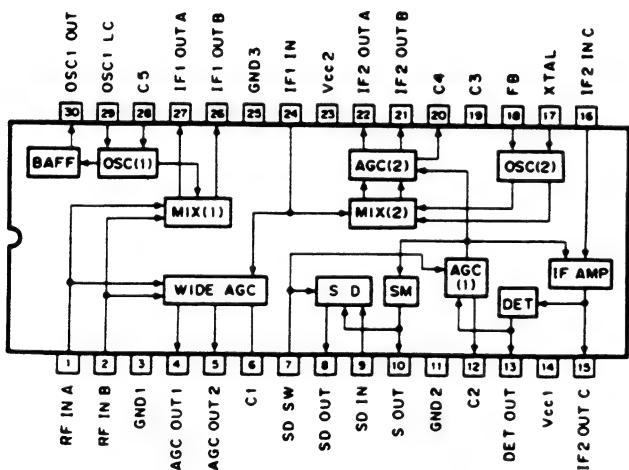
Fig. 10

• ICs

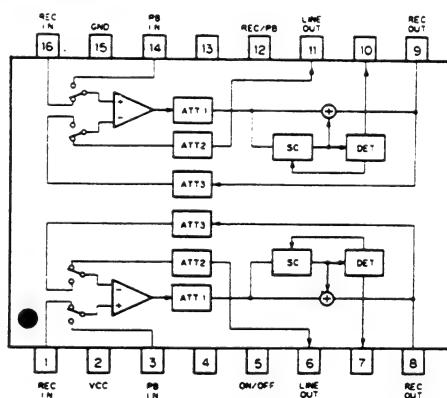
IC1: BA3430FS



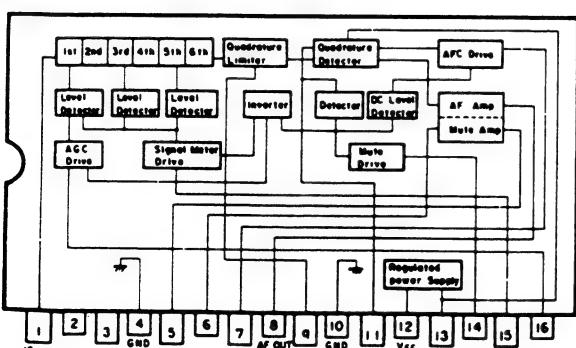
IC201: PA4010



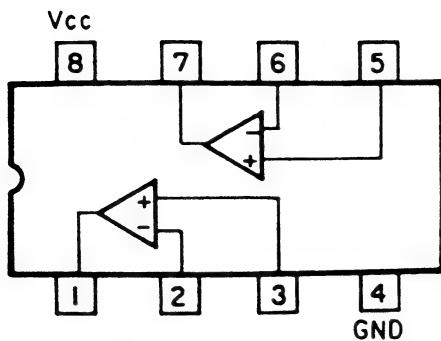
IC302: HA12134



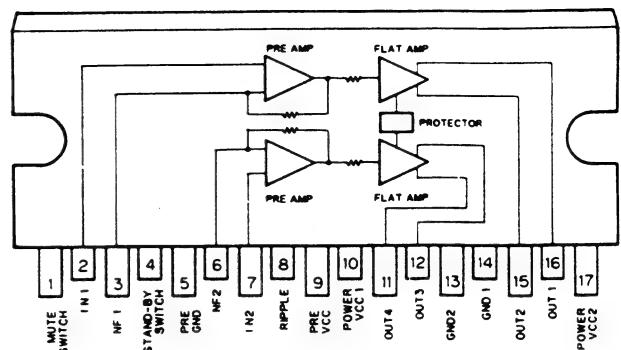
IC51: LA1140B



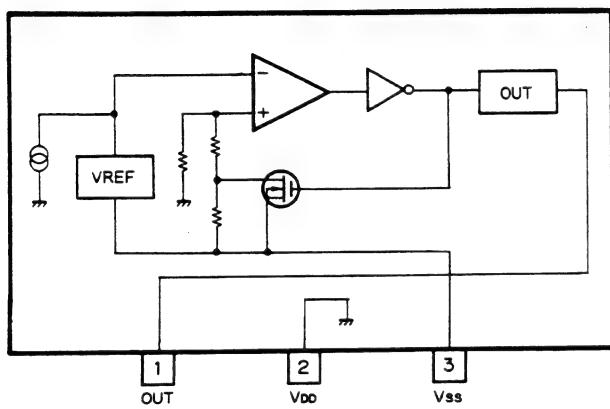
IC602: UPC4570C



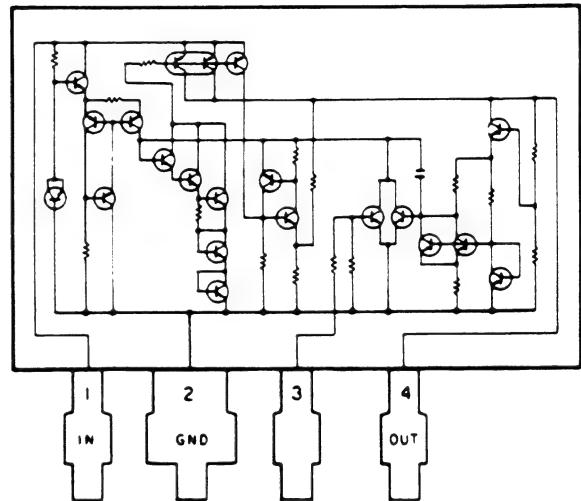
IC551, 552: TA8215L-A



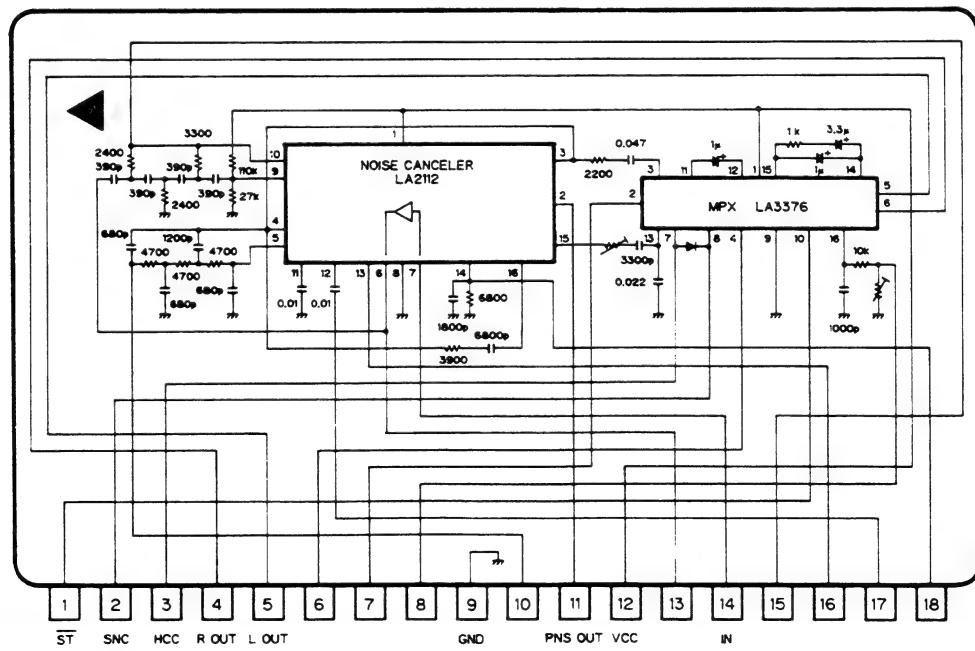
IC702: S-8053ANO



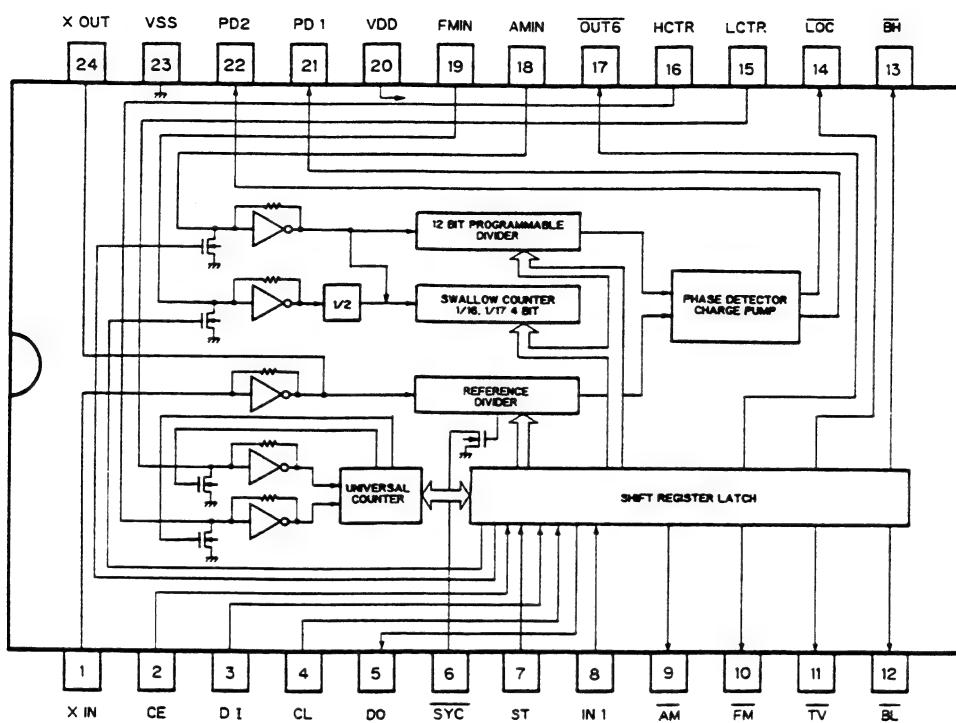
IC703: AN6540



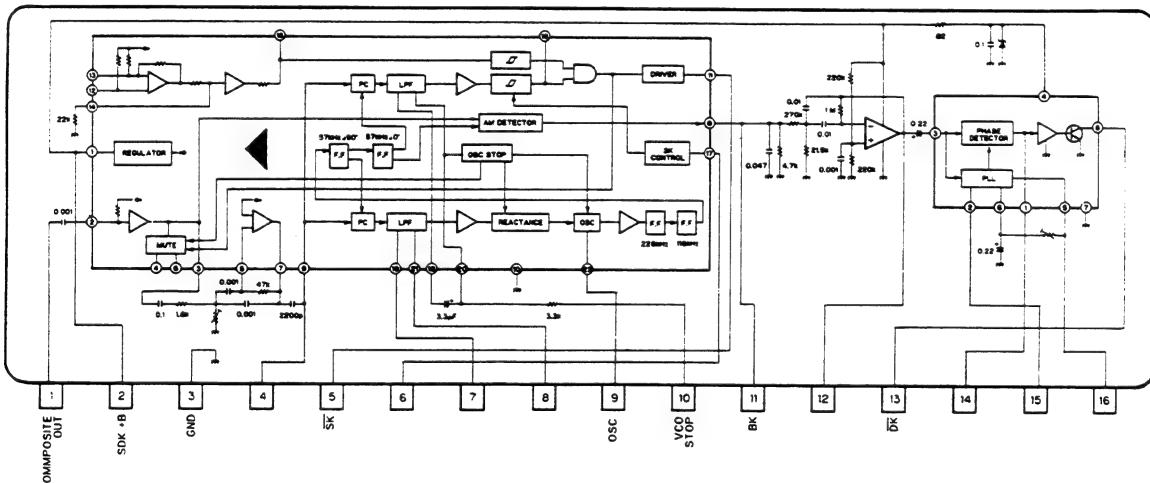
IC101: KHA1201



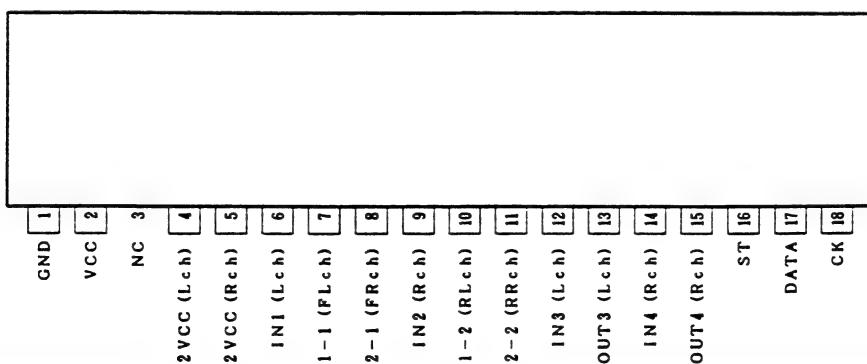
IC501: LC7218HS



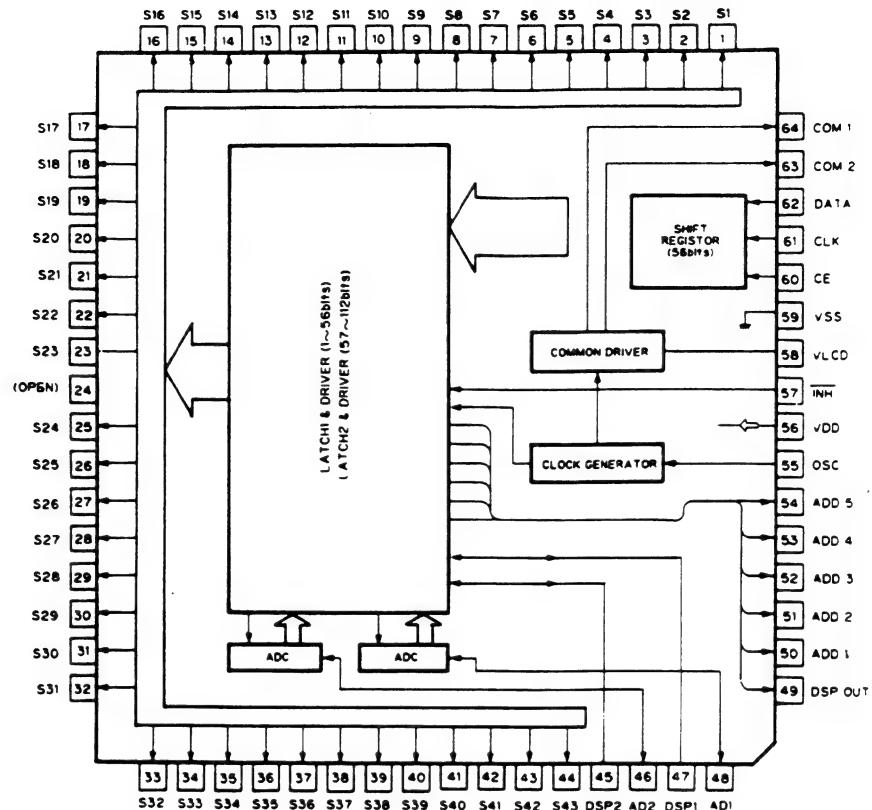
IC802: KHAC02



IC601: KHA255E



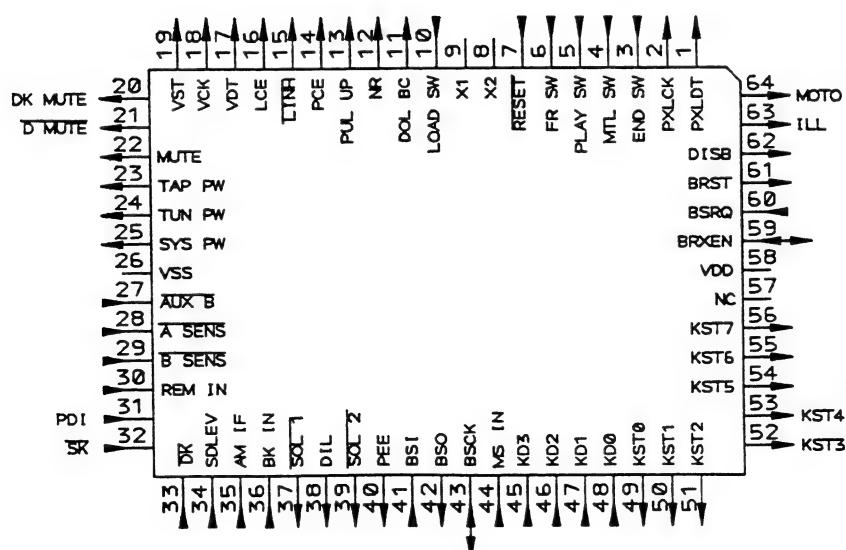
IC901: *LC7582A



IC701: *PD4190

IC's marked by *are MOS type.

Be careful in handling them because they are very liable to be damaged by electrostatic induction.



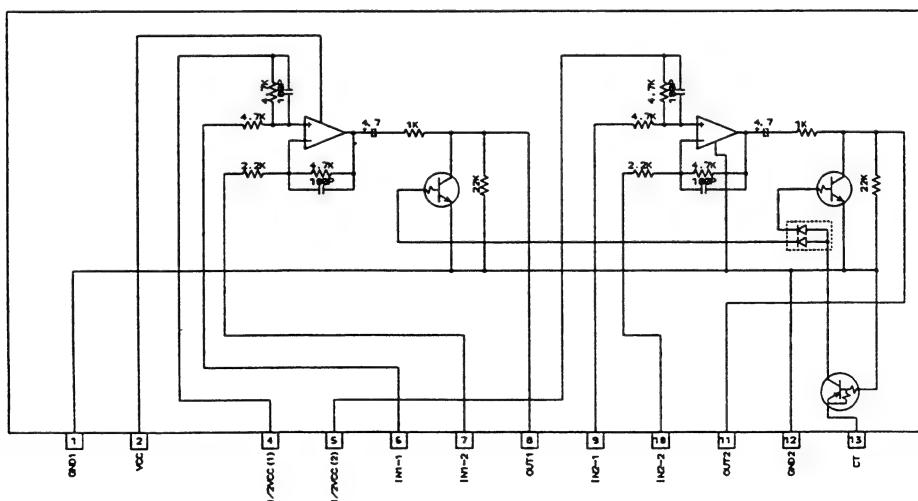
• Pin Functions (PD4190)

Pin No.	Pin Name	I/O	Output Format	Function and Operation	STBY	RST
1	PXLDT	Output	C	LCD driver IC and PLL IC data line	L	Hi-Z
2	PXLCK	Output	C	LCD driver IC and PLL IC clock line	L	Hi-Z
3	END SW	Input		Deck END sensor input		
4	MTL SW	Input		Deck METAL(70μS) sensor input		
5	PLAY SW	Input		Deck head position(PLAY) sensor input		
6	F/R SW	Input		Deck FWD/REV sensor input		
7	<u>RESET</u>	Input		Reset input		
8	X2			Crystal oscillating element connection pin		
9	X1			Crystal oscillating element connection pin		
10	LOAD SW	Input		Deck LOAD/EJECT sensor input		
11	DOLBYBC	Output	C	Dolby NR B/C selector output(Not used)	L	Hi-Z
12	NR	Output	C	Dolby NR ON/OFF output	L	Hi-Z
13	PULL UP	Output	C	Cut pull up for deck switches when BACK UP is OFF	Hi-Z	
14	PCE	Output	C	Chip enable output for PLL IC (IC501:LC7218HS)	L	Hi-Z
15	LINH	Output	C	INH control output for LCD driver IC(IC901:LC7582A)	L	Hi-Z
16	LCE	Output	C	Chip enable or strobe output for LCD driver IC	L	Hi-Z
17	VDT	Output	C	Data output for electronic volume IC(IC601:KHA255E)	L	Hi-Z
18	VCK	Output	C	Clock output for electronic volume IC(IC601:KHA255E)	L	Hi-Z
19	VST	Output	C	Strobe output for electronic volume IC(IC601:KHA255E)	L	Hi-Z
20	DK MUTE	Output	C	Not used	H	Hi-Z
21	<u>D MUTE</u>	Output	C	Deck mute output	H	Hi-Z
22	MUTE	Output	C	System mute output	H	Hi-Z
23	TAP PW	Output	C	Deck power supply control(Not used)	L	Hi-Z
24	TUN PW	Output	C	Tuner power supply control	L	Hi-Z
25	SYS PW	Output	C	System(power amp)power supply control	L	Hi-Z
26	VSS			GND		
27	<u>AUX B</u>	Input		AUX B sensor input		
28	<u>A SENS</u>	Input		ACC power supply sensor input		
29	<u>B SENS</u>	Input		BACK UP power supply sensor input		
30	REM IN	Input		Remote control pulse input		
31	PDI	Input		Data input for PLL IC (IC501:LC7218HS)	L	Hi-Z
32	<u>SK</u>	Input		SK signal input		
33	<u>DK</u>	Input		DK signal input		
34	SDLEV	Input		Input level sensor input		
35	AM IF	Input		AM IF count input		
36	<u>BK IN</u>	Input		BK signal input(Not used)		
37	<u>SOL 1</u>	Output	C	Output for deck solenoid 1 (head position)	L	Hi-Z
38	<u>DIL</u>	Output	C	Deck FWD/REV head selector output	Keep	Hi-Z
39	<u>SOL 2</u>	Output	C	Output for deck solenoid 2 (DIR selector and EJECT)	L	Hi-Z
40	PEE	Output	C	Beep tone output	L	Hi-Z

Pin No.	Pin Name	I/O	Output Format	Function and Operation	STBY	RST
41	BSI	Input		Bus serial data input		
42	BSO	Output	C	Bus serial data output		
43	BSCK	Input/ Output	C	Bus serial clock input/output		
44	MS IN	Input		Music signal input		
45~48	KD3~KD0	Input		Key return input		
49	KST0	Output	NM	Model sense strobe output	Hi-Z	Hi-Z
50	KST1	Output	NM	Model sense strobe output	Hi-Z	Hi-Z
51~56	KST2~ KST7	Output	NM	Key strobe output		
57	NC					
58	VDD					
59	BRXEN	Input/ Output	C	Bus reception enable line		
60	BSRQ	Input		Data communications serial poll request	L	Hi-Z
61	BRST	Output	C	Bus reset	H	Hi-Z
62	DISB	Output	C	AUX control output (Not used)	L	Hi-Z
63	ILL	Output	C	Illumination green/amber selector output	Keep	Hi-Z
64	MOTO	Output	C	Deck main motor control output	L	Hi-Z

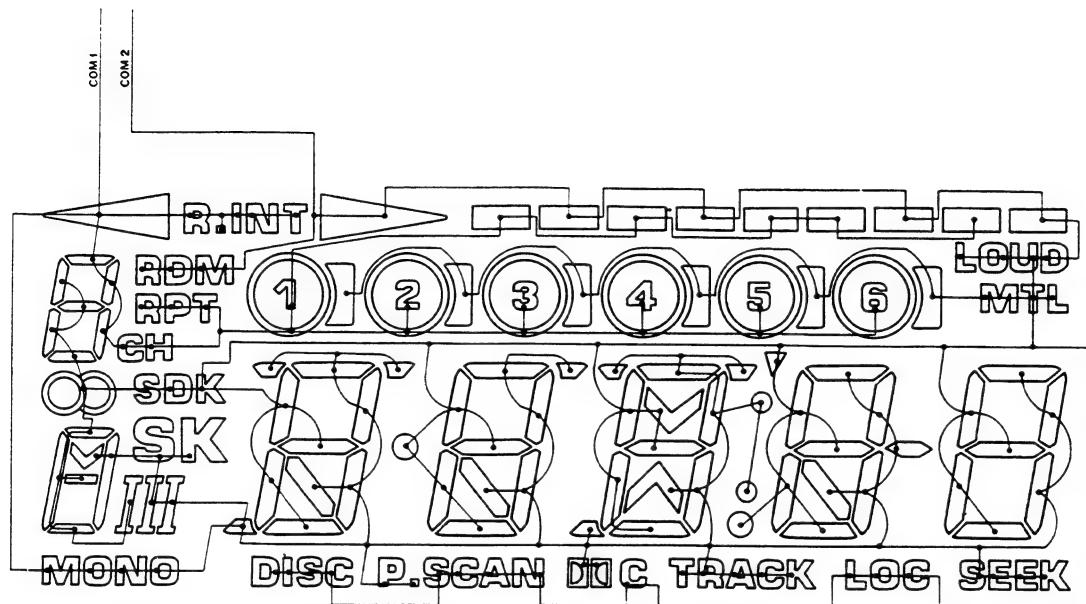
Output Format	Meaning
C	CMOS Output
NM	Neutral resistivity N channel open drain

IC851: KHA158

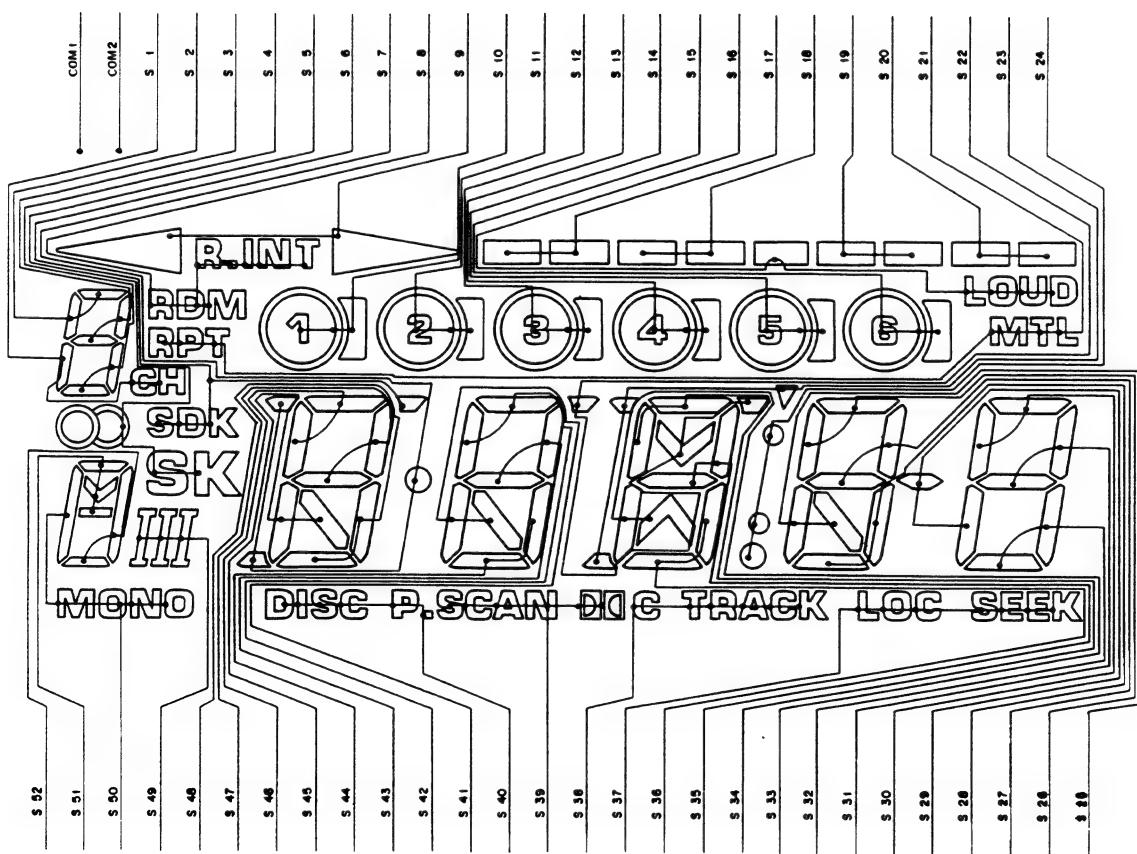


• LCD (CAW1061)

COMMON



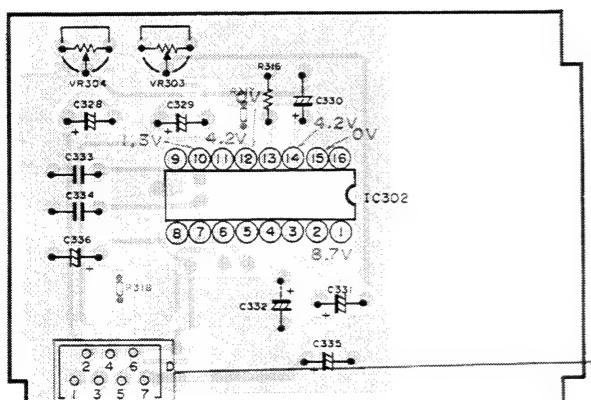
SEGMENT



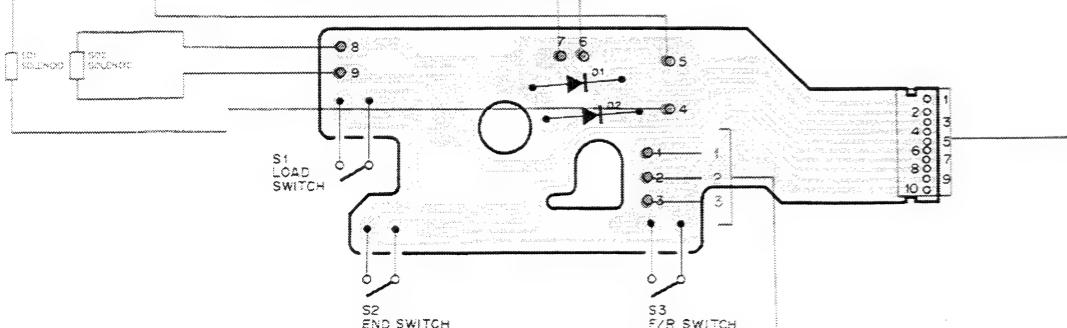
8. CONNECTION DIAGRAM (KEH-M5002SDK/WG)

A

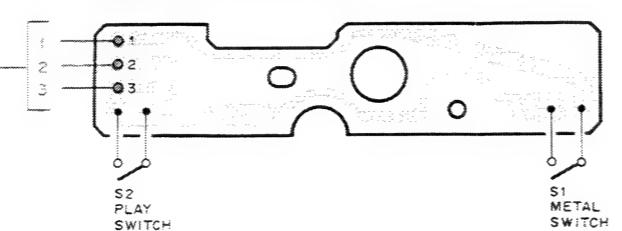
DOLBY NR P.C BOARD

IC IC302
ADJ VR304 VR303

CONNECTOR P.C BOARD

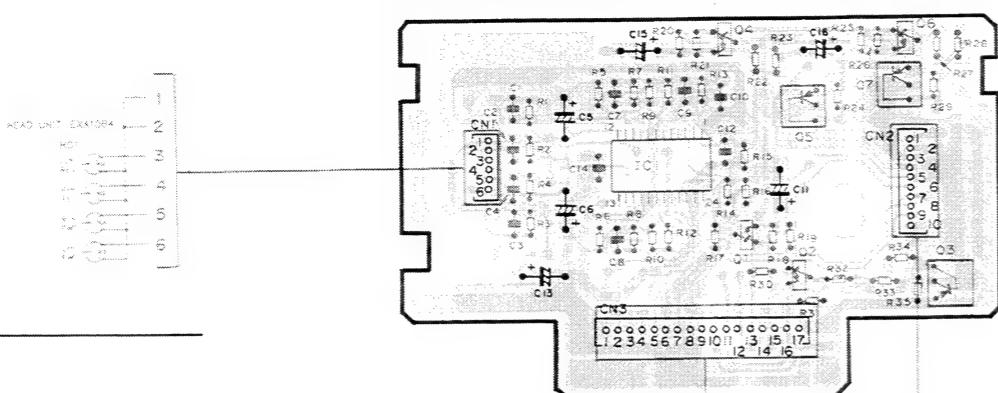


SWITCH P.C BOARD

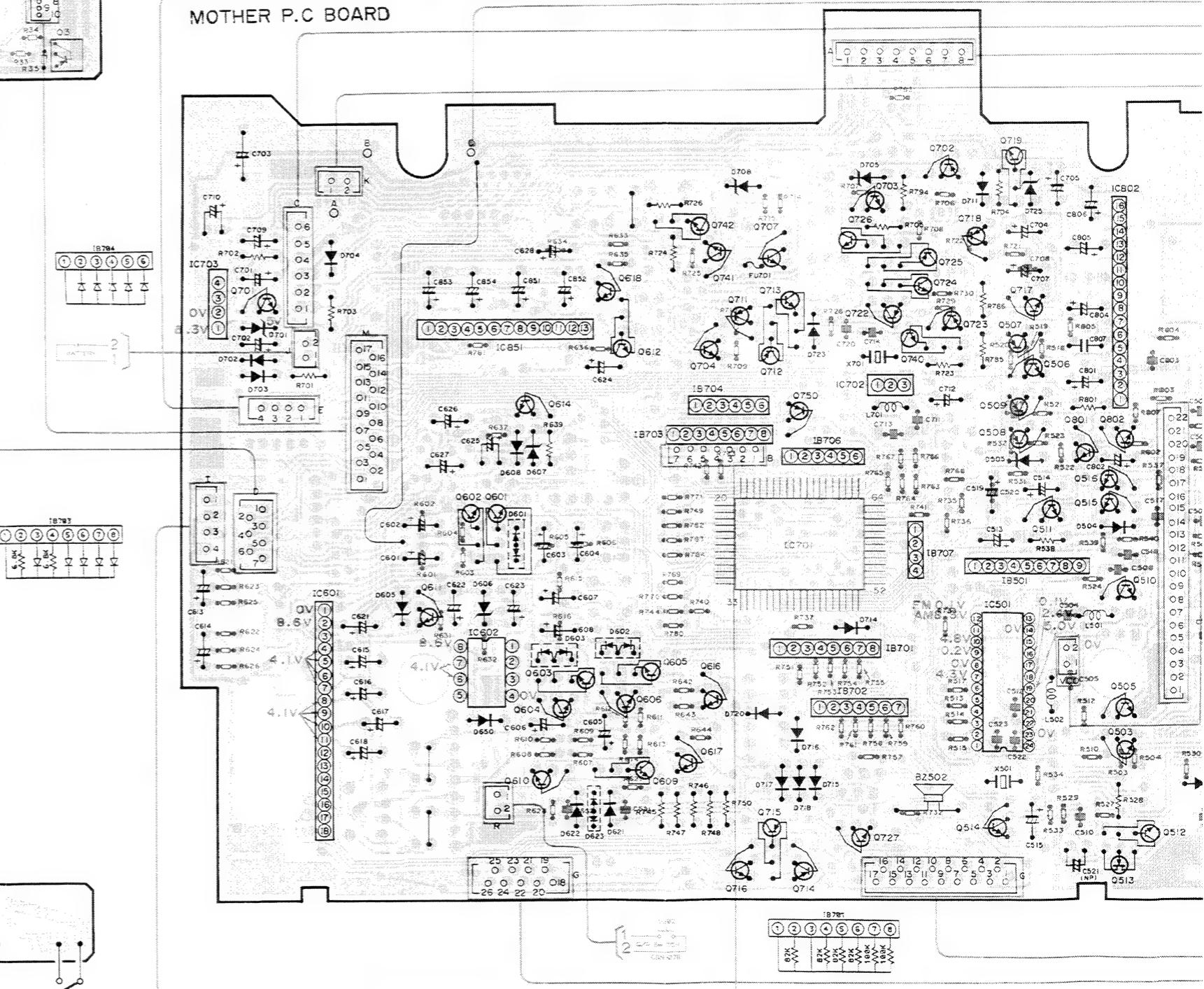


MECHANISM CONTROL UNIT

IC, Q IC1 Q4 Q5 Q1 Q2 Q3 Q6 Q7

IC701 IB702
Q703 Q726 Q702 Q718
Q742 Q741 Q707 Q725 Q724 Q723 Q740 Q506 Q507 Q717 Q719
Q618 Q612 Q704 Q711 Q713 Q712 IB704 Q750 Q509 Q508 Q801 Q802 Q511 Q516 Q5IC703 Q701 IC851 Q602 Q601 Q614 IB703 IB706 IC702 IB707 IC501 IB501 Q510 Q503 Q5
IC601 IC602 Q611 Q610 Q604 Q603 Q605 Q606 Q609 Q616 Q617 Q716 Q715 Q714 Q727 Q514 Q513 Q512

MOTHER P.C BOARD



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Q718
 Q740 Q506 Q507 Q717 Q719 IC502
 Q508 Q801 Q802 Q511 Q516 Q515 Q504
 IC501 IB501 Q510 Q503 Q505 Q501
 27 Q514 Q513 Q512

IC, Q IC551 Q551 Q552 Q556 Q555 Q553 Q554

IC552

AMP. P.C BOARD

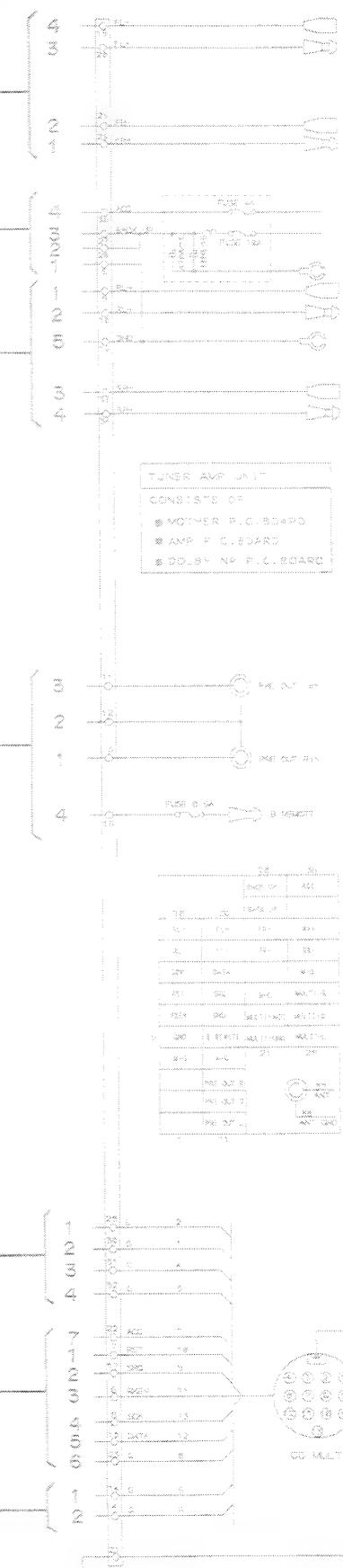
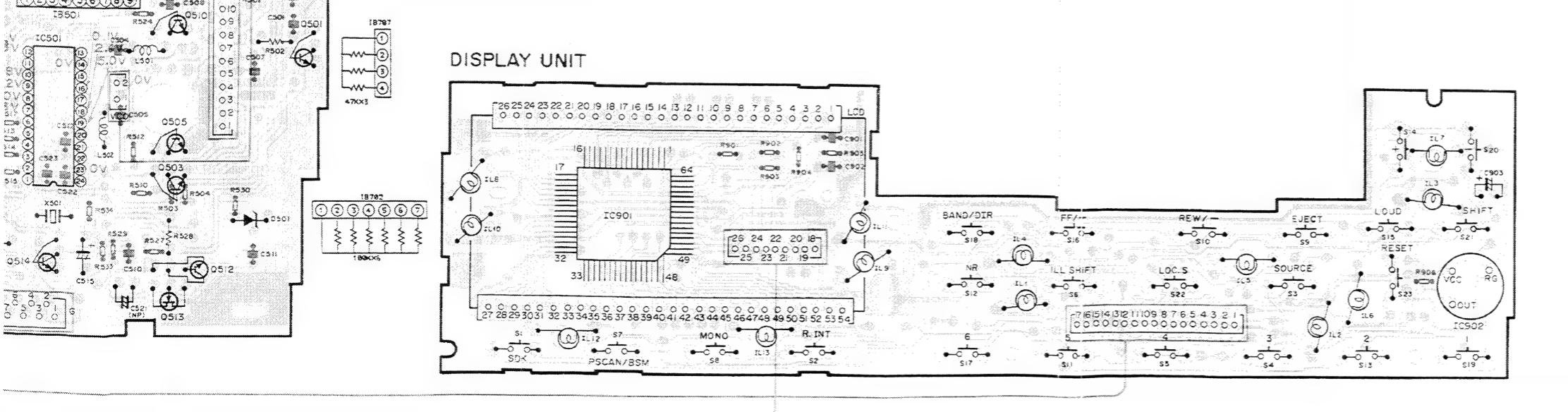
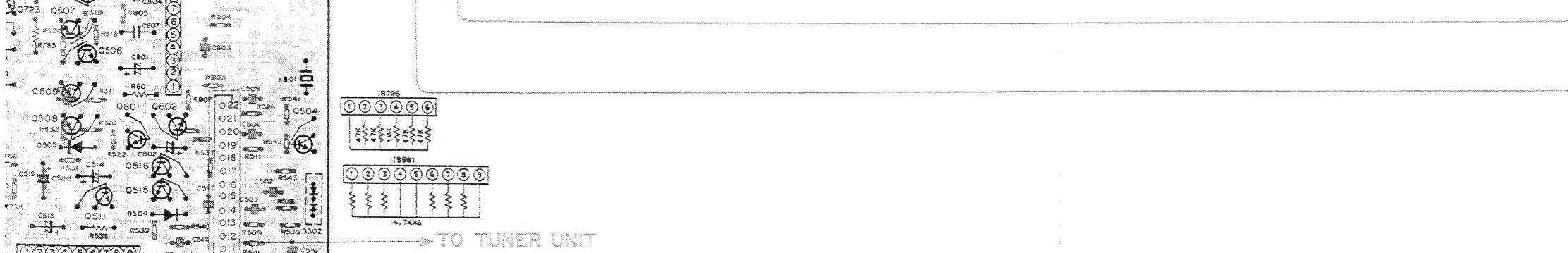
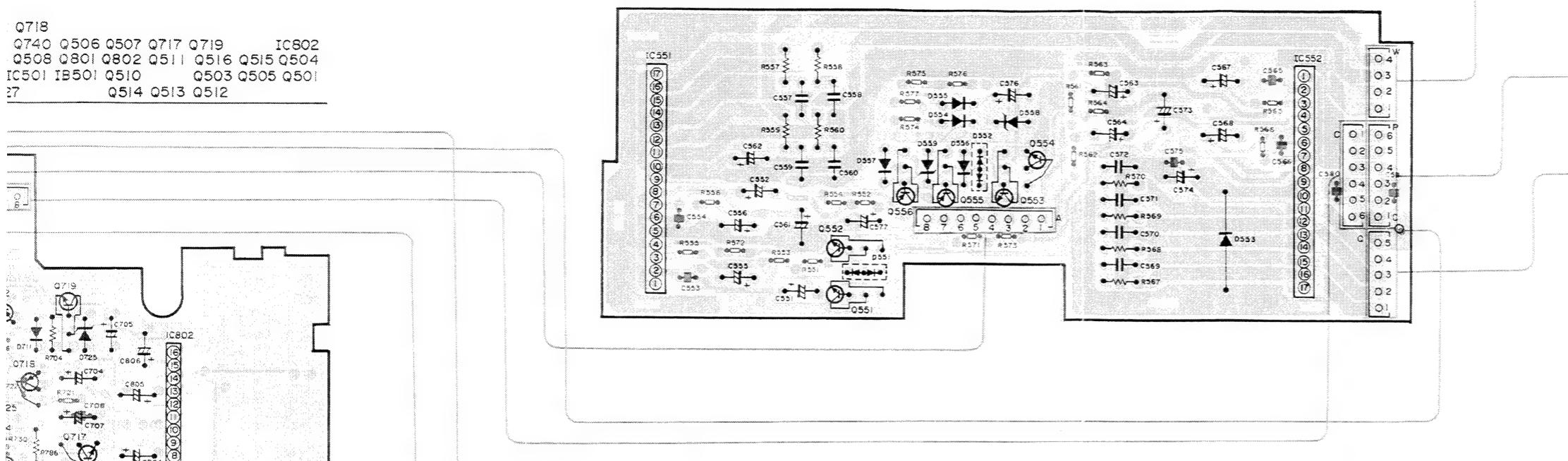
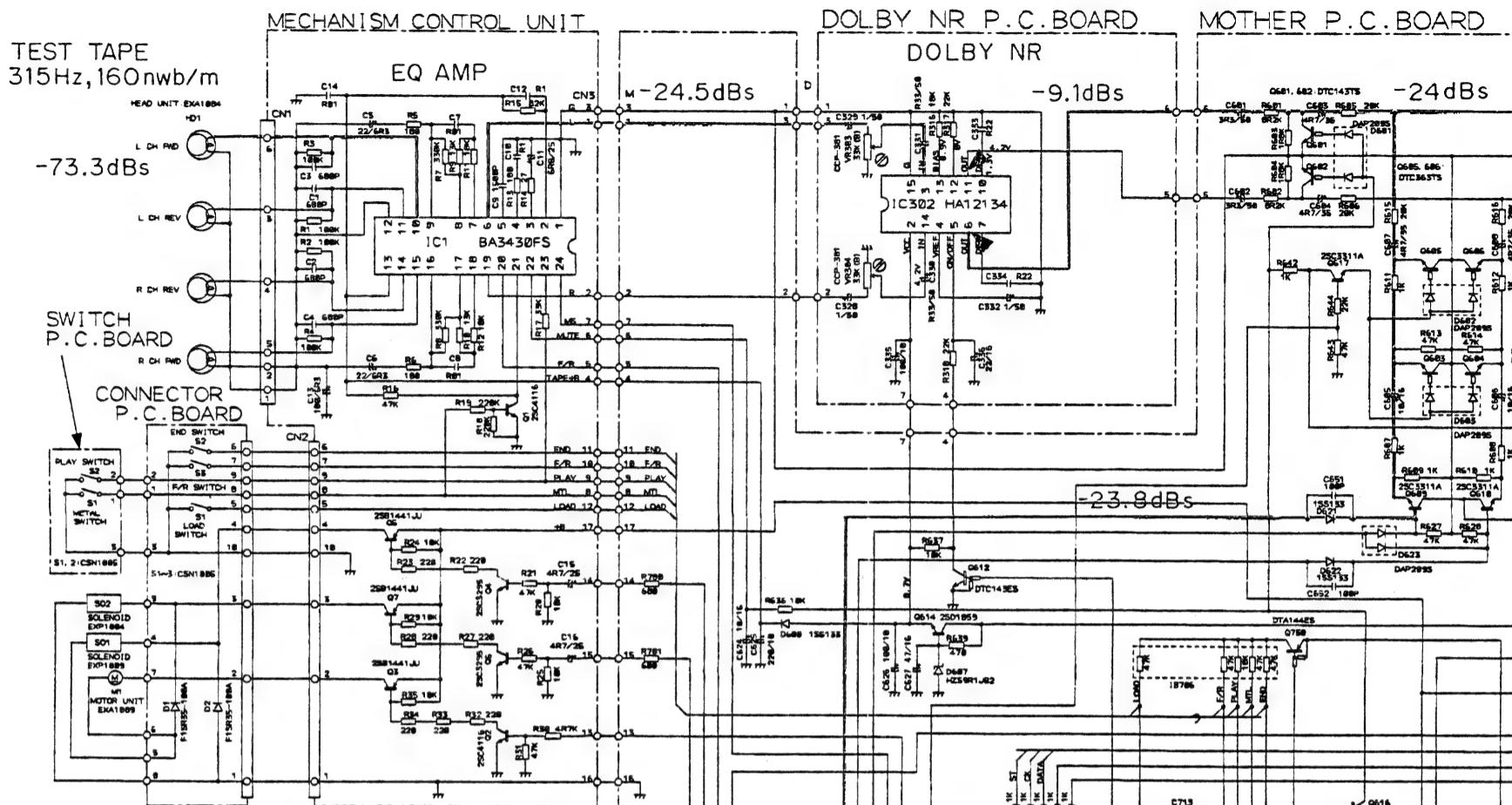


Fig. 11

9. SCHEMATIC CIRCUIT DIAGRAM (KEH-M5002SDK/WG)

A



B

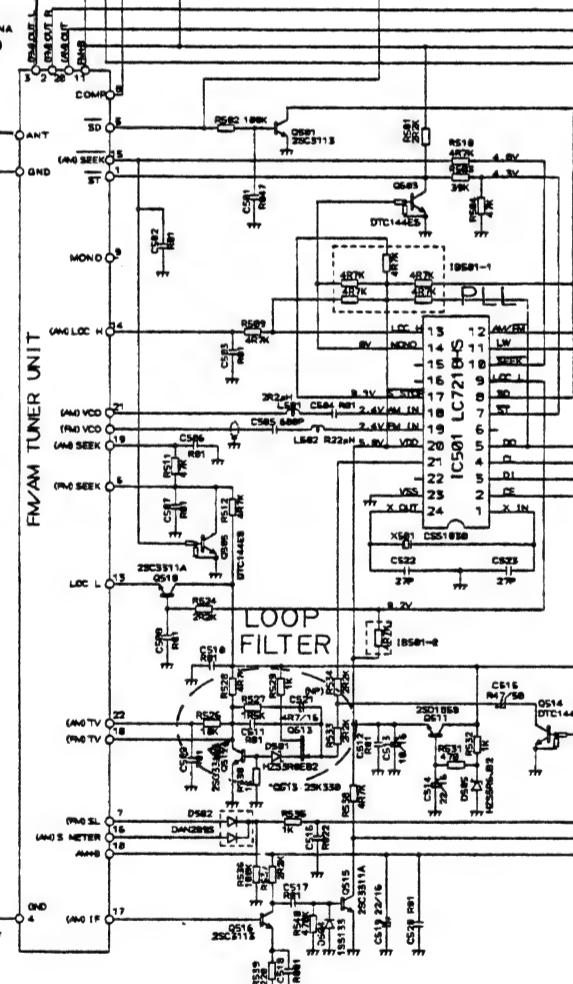
SWITCH P.C. BOARD
CONNECTOR P.C. BOARD

PLAY SWITCH
FVR SWITCH
METAL SWITCH
LOAD SWITCH

S1, 2: CSN1886
S1~3: CSN1885
S02: SOLENOID EXP1884
S01: SOLENOID EXP1889
MOTOR UNIT: EXA1899

JCB02 KHAC02 SDK

C



D

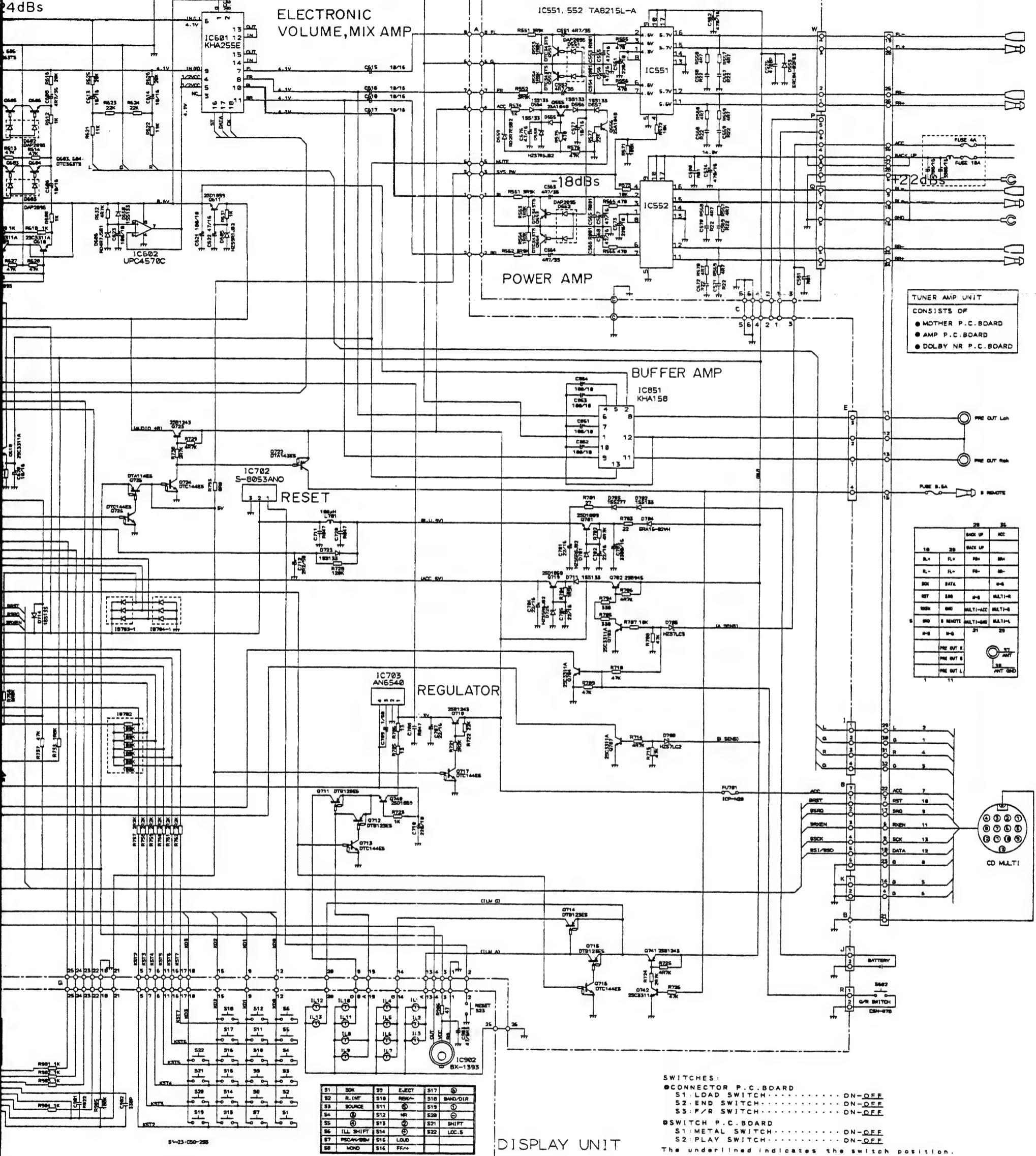
JC701 PD4190
SYSTEM CONTROL

OK MUTE
OK 21
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TAP PW
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TUN PW
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SV PW
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VSS
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ADJ 3
28
X SENS
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W MODE
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PD151
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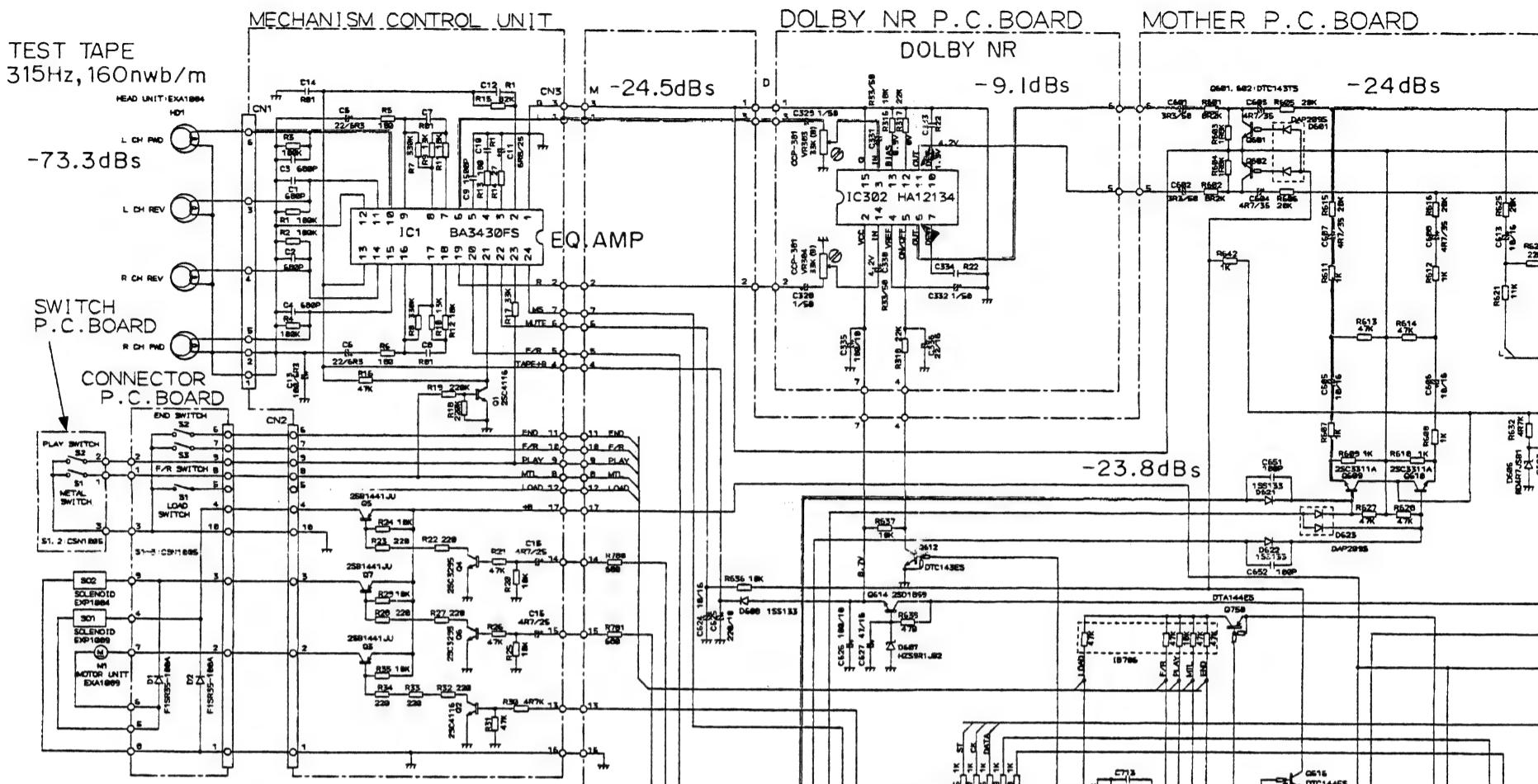
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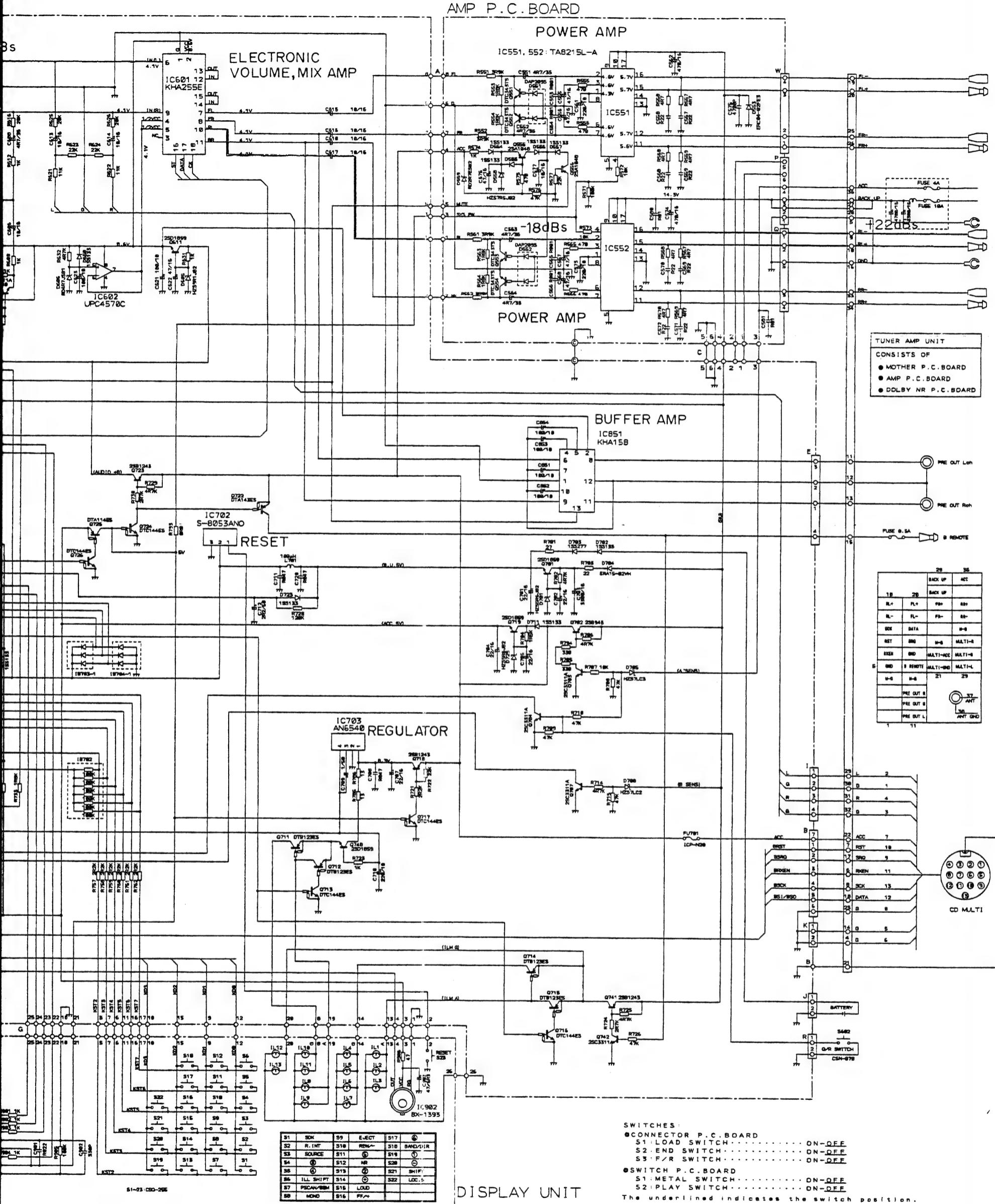
24dBs



10. SCHEMATIC CIRCUIT DIAGRAM (KEH-M5002B/EW)

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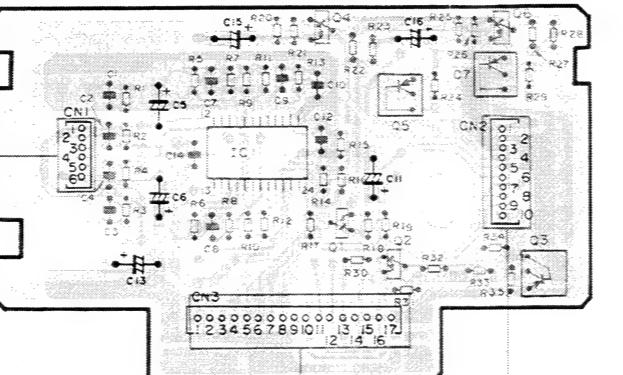
5

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11. CONNECTION DIAGRAM (KEH-M5002B/EW)

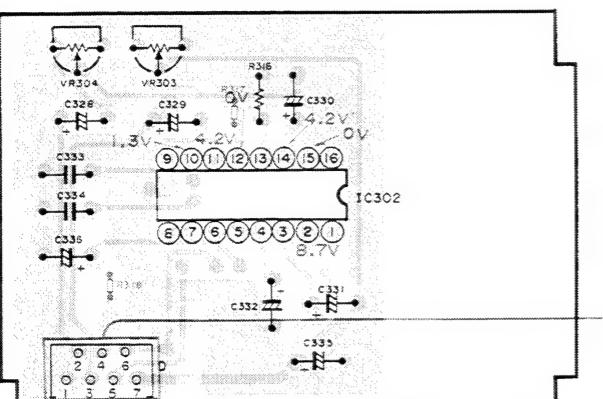
MECHANISM CONTROL UNIT

IC, Q IC1 Q4 Q5 Q6
Q1 Q2 Q3 Q7



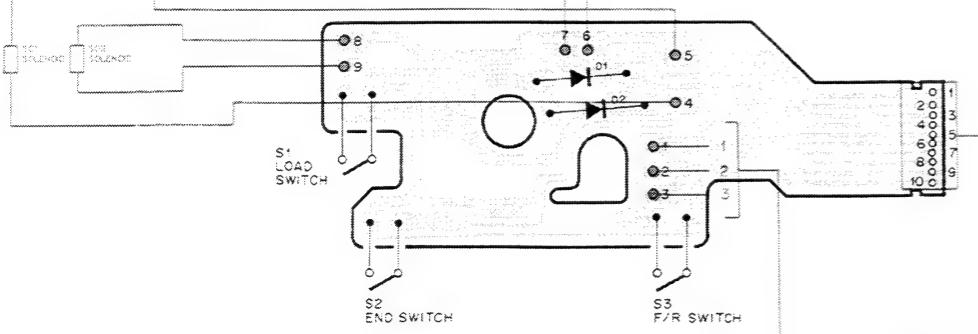
DOLBY NR P.C BOARD

IC IC302
ADJ VR304 VR303



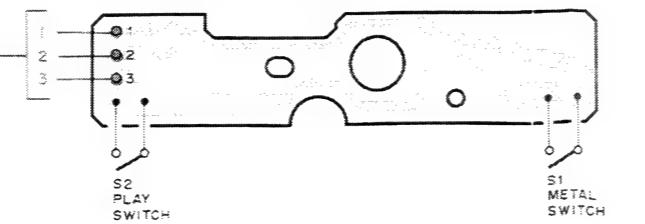
B

CONNECTOR P.C BOARD



D

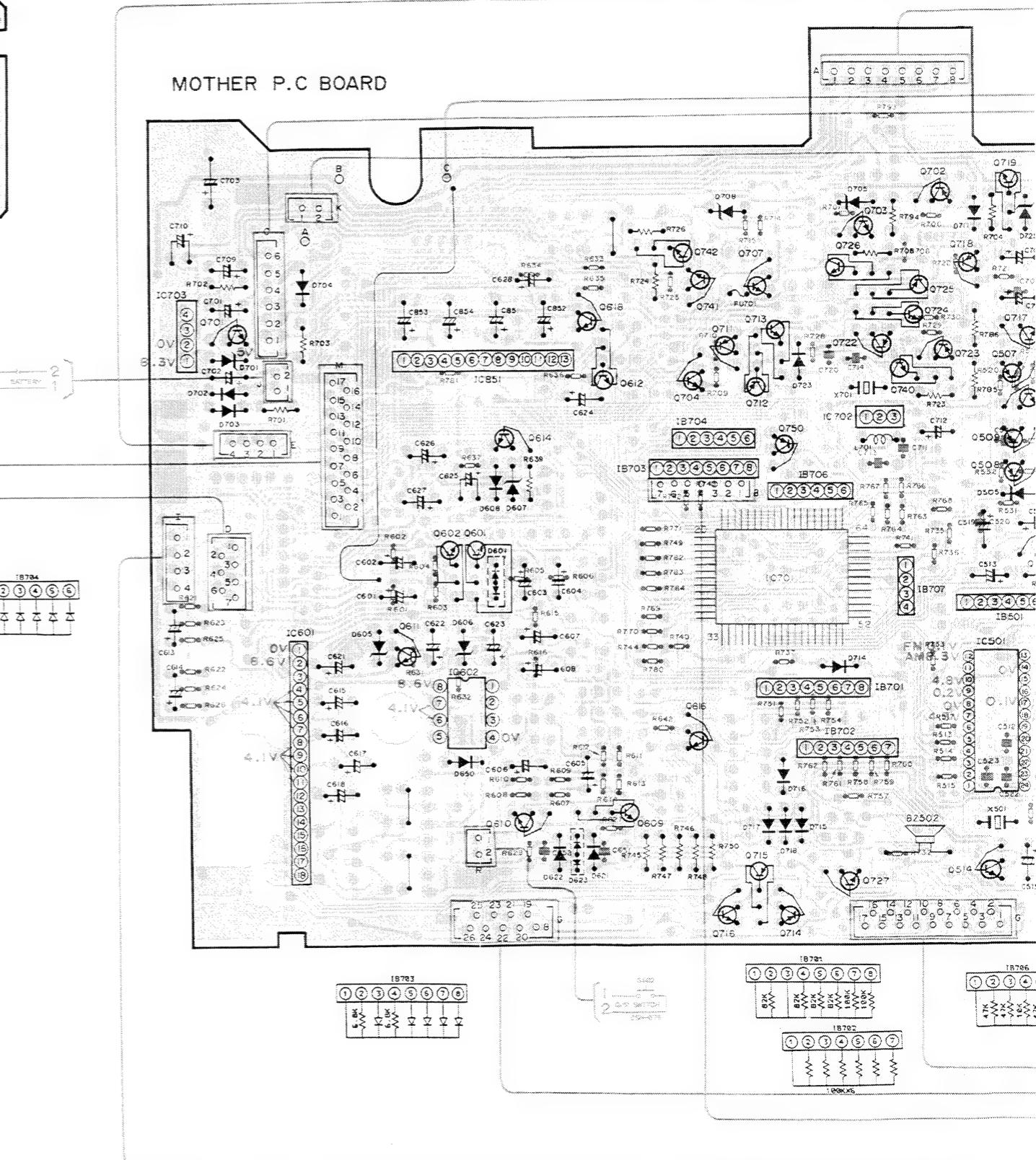
SWITCH P.C BOARD



IC703 Q701
IC, Q IC601
IC851 Q602 Q601 Q610

Q742 Q741 Q707
Q704 Q711 Q713 Q712 IB704 Q750 Q509 Q508
IB703 IB706 IC702 IB701 IB707 IC501 IB501
Q609 Q616 Q716 Q715 Q714 Q727

MOTHER P.C BOARD



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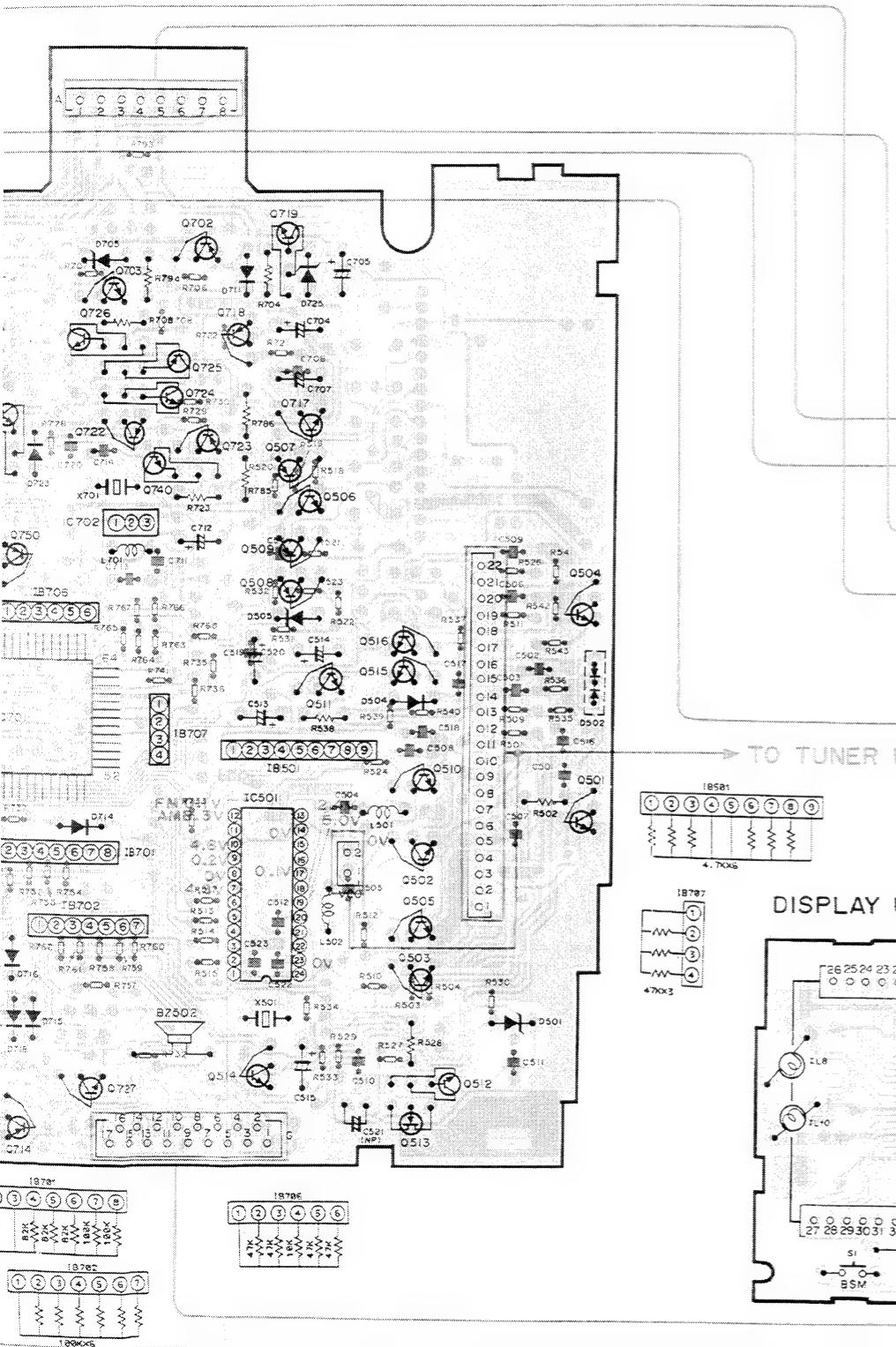
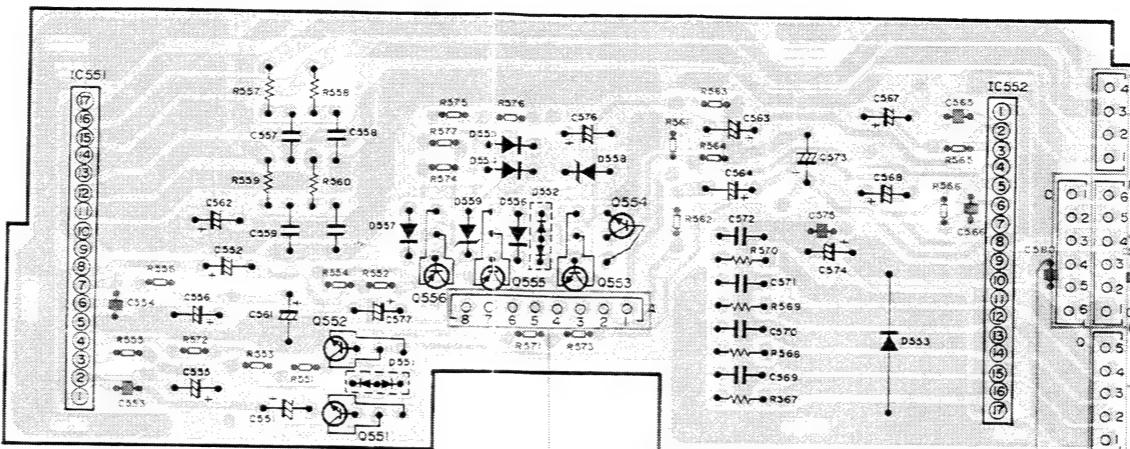
7 8 9 10 11 12

C701 IB702
 Q703 Q726 Q702 Q718
 1725 Q724 Q722 Q723 Q740 Q506 Q507 Q717 Q719
 '12 IB704 Q750 Q509 Q508 Q511 Q516 Q515 Q504
 IC702 IB701 IB707 IC501 IB501 Q510 Q502 Q503 Q505 Q501
 Q716 Q715 Q714 Q727 Q514 Q513 Q512

IC, Q IC551 Q551 Q552 Q556 Q555 Q553 Q554

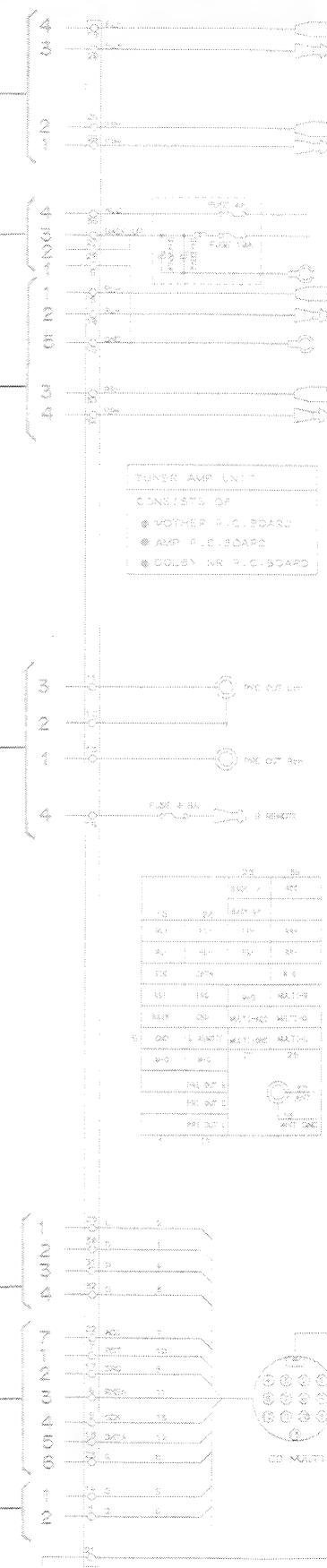
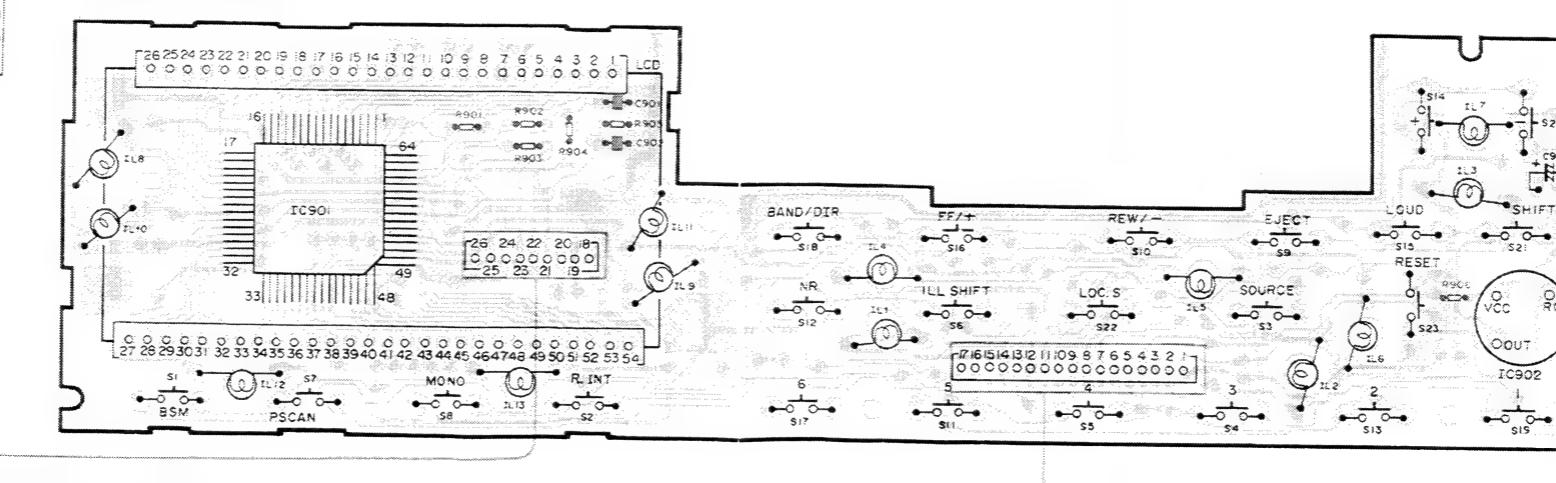
IC552

AMP. P.C BOARD



TO TUNER UNIT

DISPLAY UNIT



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B

C

D

Fig. 14

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12. FM/AM TUNER UNIT

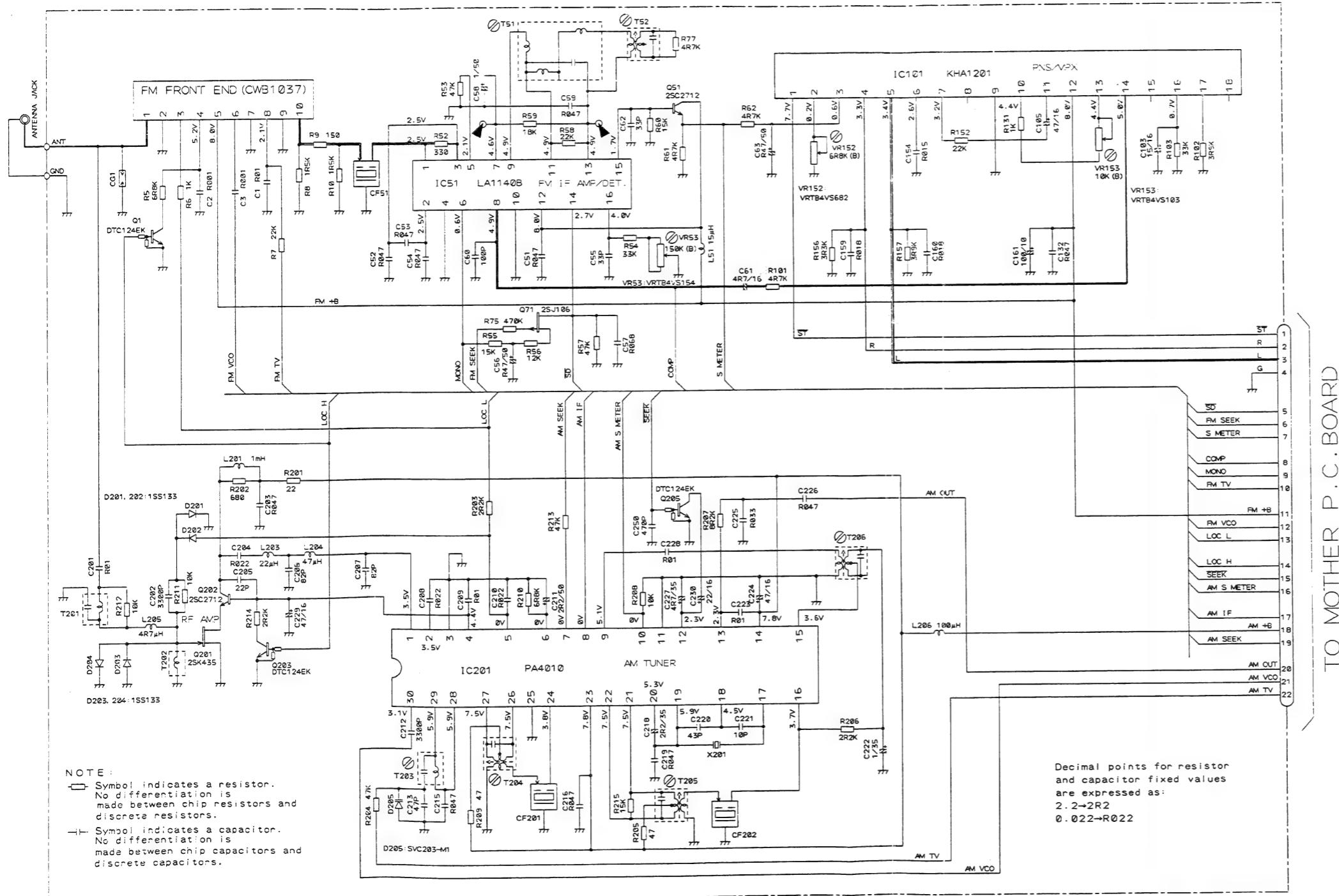


Fig. 15

13. EXPLODED VIEW

NOTE:

- The parts marked with “●” may need long time to supply and their supply is subject to refuse as the case may be.
 - Because the parts with encircled number shown on the dismantling drawing are not spare parts, we are unable to supply them in principle.

- Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Remote Control Assy (EW)	CXA2958	33	LCD	CAW1061
2	Cover (EW)	CZN3224	34	Insulator	CNM2178
3	Screw	BMZ26P050FMC	35	Cover	CNC2536
			36	Cushion	CNM2511
			37	Lens	CNV2288
●	4 Cassette Mechanism Assy	EXK1450	38	Cushion	CNM2176
	5 Arm	CNV2078	39	Button	CAC1988
●	6 Mechanism Control Unit	CWM1967	40	Button	CAC1987
	7 Connector (10P)	CKS1773	41	Button	CAC1989
	8 Connector (6P)	CKS1771	42	Button	CAC1990
	9 Connector (17P)	CKS1708	43	Spacer	CNM2470
	10 Screw	CBA1022	44	Button	CAC1831
	11 Case	CNB1260	45	Button	CAC1830
	12		46	Button	CAC1832
			47	Button	CAC1998
	13 Insulator	CNM2208	48	Button	CAC1833
●	14 FM/AM Tuner Unit	CWE1146	49	Button	CAC1834
	15 Plug (22P)	CKS1736	50	Button	CAC1804
	16 FM Front End	CWB1037	51	Stopper	CNC2535
	17 Insulator	CNM2168	52	Spacer	CNM2448
	18 Antenna Jack	CKX1010	53	Shaft	CLA1550
	19 Chassis	CNC2556	54	Button (1)	CAC2211
	20 Insulator	CNM2352	55	Button (2)	CAC2212
	21 Screw	BPZ20P060FMC	56	Button (3)	CAC2213
●	22 Display Unit	CWS1214	57	Button (4)	CAC2214
	23 Spacer	CNM1642	58	Button (5)	CAC2215
	24 Bush	CNV-724	59	Button (6)	CAC2216
	25 Lamp	CEL-147	60	Button	CAC1997
	26 Lamp	CEL1013	61	Grille Assy (WG)	CXA4164
	27 P.C. Board	CNP2094		Grille Assy (EW)	CXA4166
	28 P.C. Board	CNP2093	62	Spring	CBH1215
	29 Lamp	CEL1115	63	Door	CAT1389
	30 Housing	CNV2046	64, 65	.....
	31 Lens	CNV2045	66	Screw	BMZ30P100FMC
	32 Half Mirror	CNM2314	67	Holder	CNC2633

Fig. 17

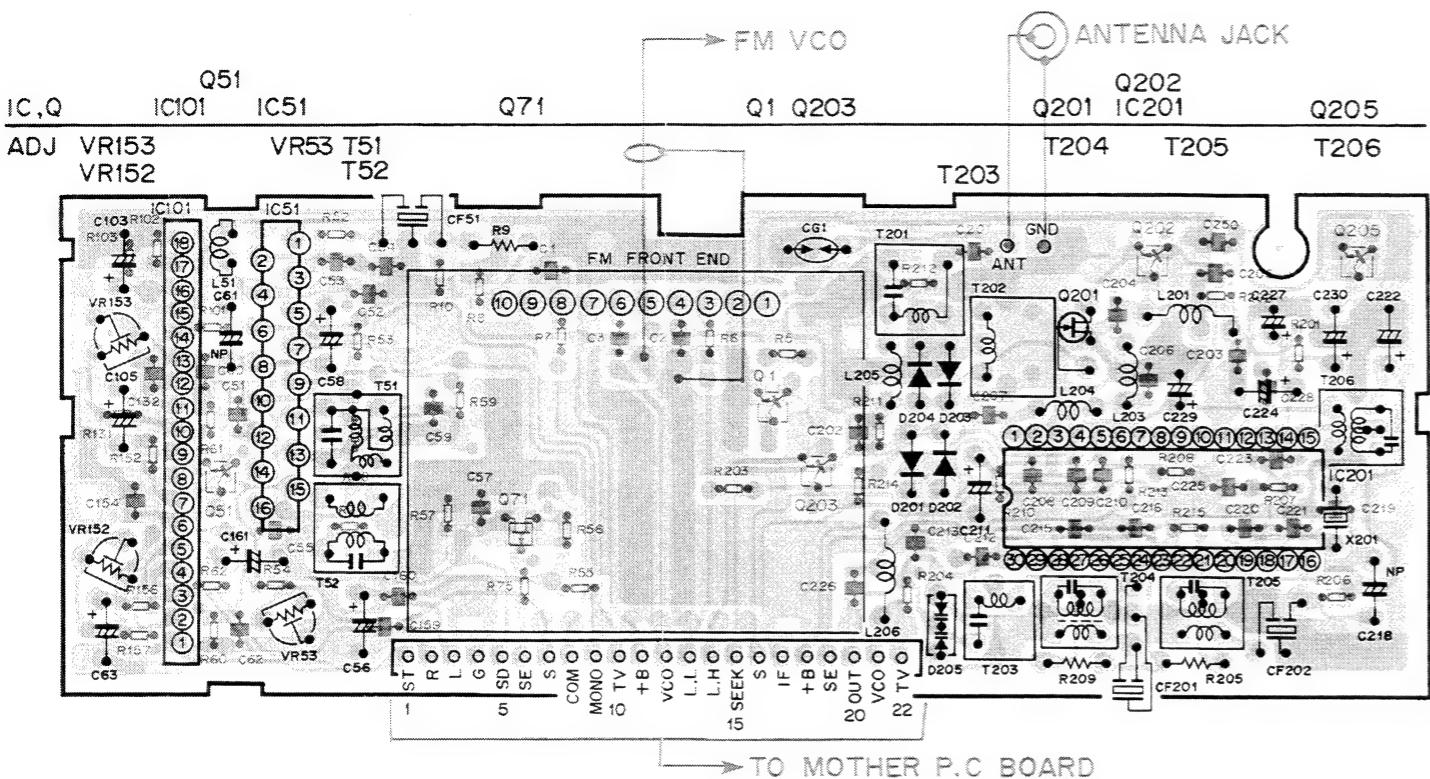


Fig. 16

- FM FRONT END (CWB1037)

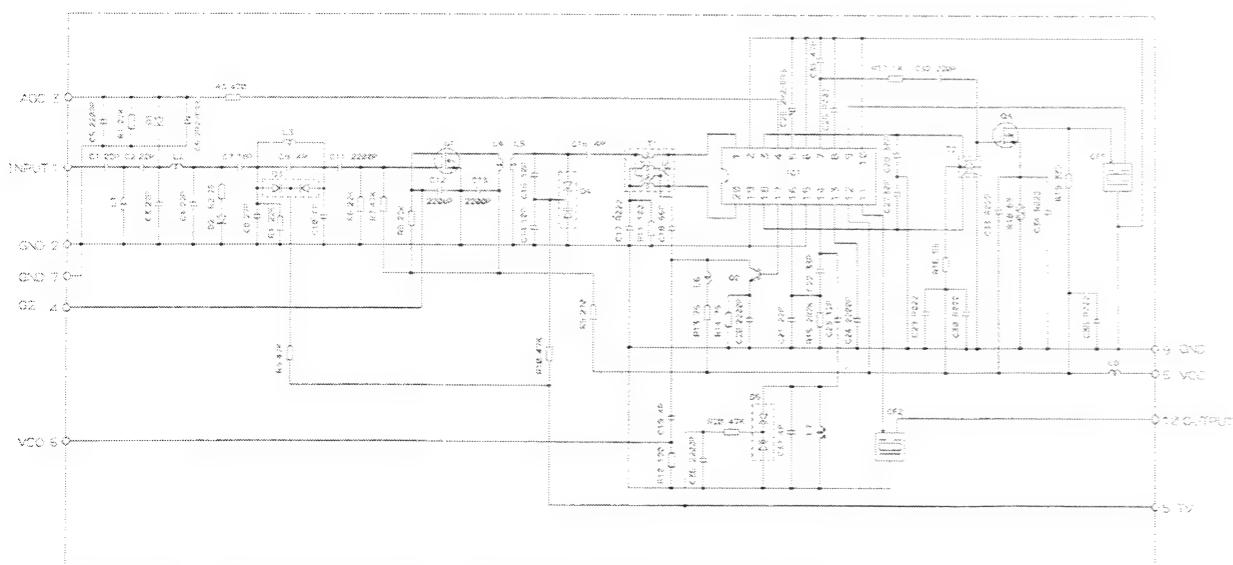


Fig. 17

Mark No.	Description	Part No.	Mark No.	Description	Part No.
68	IC	TA8215L-A	109-111	.....
69	Heat Sink	CNR1137	① 112	Tuner Amp Unit (WG)	CWM2703
70	Connector (8P)	HKS-159	① 113	Tuner Amp Unit (EW)	CWM2705
71	Connector (6P)	CDE2351	113	Plug (2P)	CKS1035
72, 73	.....		114	Connector (2P)	CDE2481
74	Holder	CNC2634	115	Cord Assy	CDE2304
75	Plug (8P)	CKS1734	116	Holder	CNC2938
76	Clamper	CNV1335	117	Spacer	CNM2469
77	Plug (7P)	CKS1684	① 118	Handle Assy	CXA2944
78	Connector (17P)	CKS1265	119	Screw	CBA1109
79	Connector (9P)	CKS1257	120	Cover	CNS1807
80	Plug (2P)	CKS1222	121	Box	CNB1273
81	Plug (6P)	CKS-570	122	Cord Assy (WG)	CDE3319
82	Plug (4P)	CKS1667		Cord Assy (EW)	CDE3318
83	.....		123	Screw	CBA1073
84	Connector (17P)	CKS1727	124	Screw	BMZ30P030FMC
85	.....		125	Clamper	CNC2554
86	Plug (7P)	CKS1717	126	Air Cushioned Bag	CEG1053
87	Plug (4P)	CKS1224	127	Holder Unit	CXA3056
88	Holder	CNC2637	128	Connector (2P)	CDE2591
89	IC	AN6540	129	Switch	CSN-078
90	Screw	BMZ30P040FMC	130	Holder	CNC2182
91	Plug (7P)	CKS1751	131	Screw	CBA-172
92	Holder	CNC2638	132	Connector (2P)	CDE2449
93	Screw	BMZ30P050FMC	133	Cover	CNS1958
94-104	.....		134	Cap	CNW-829
105	Insulator	CNM2207			
106	Screw	BMZ30P060FMC			
107	.....			
108	Chassis Unit (WG)	CXA4209			
	Chassis Unit (EW)	CXA2718			

- **Exploded View**

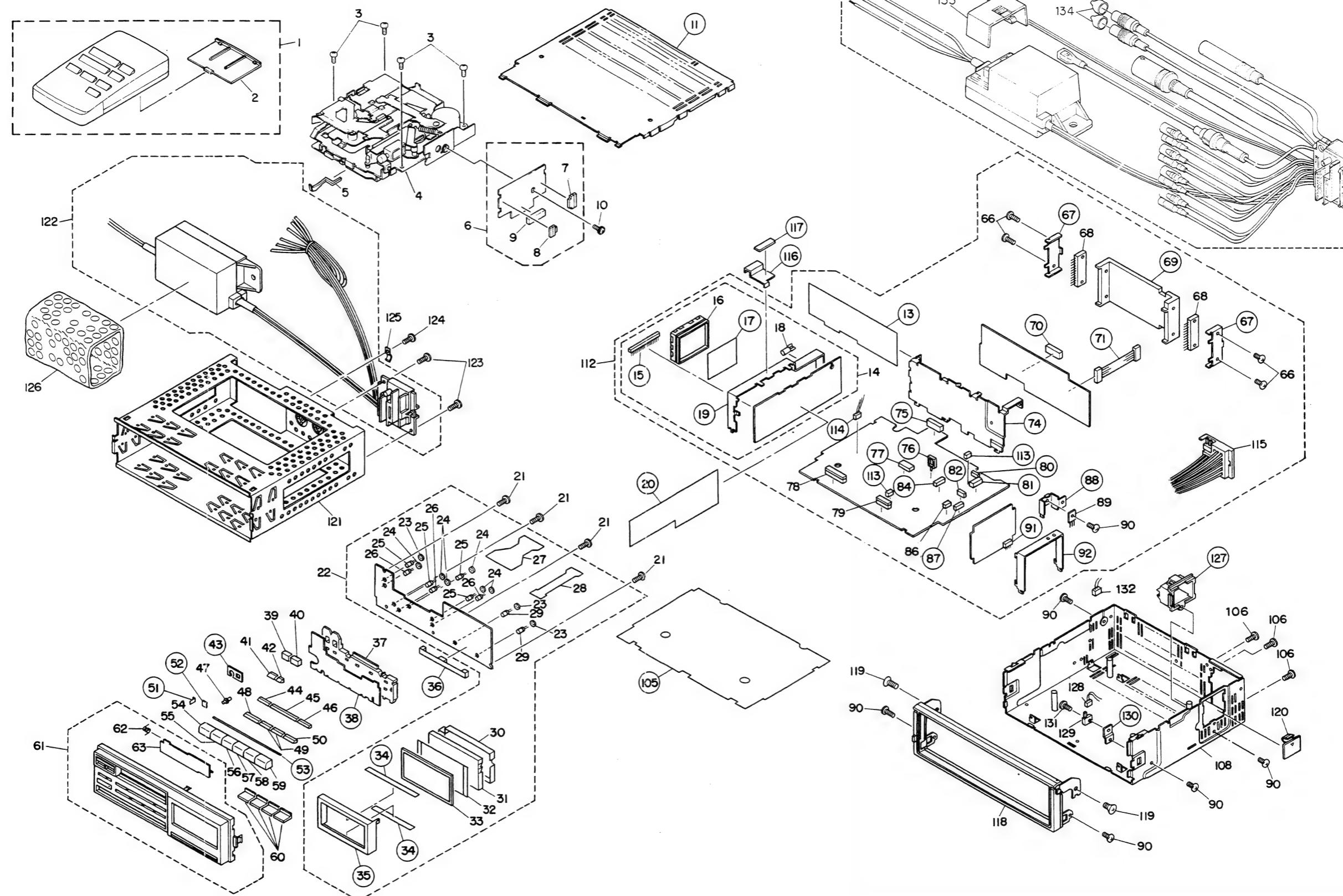
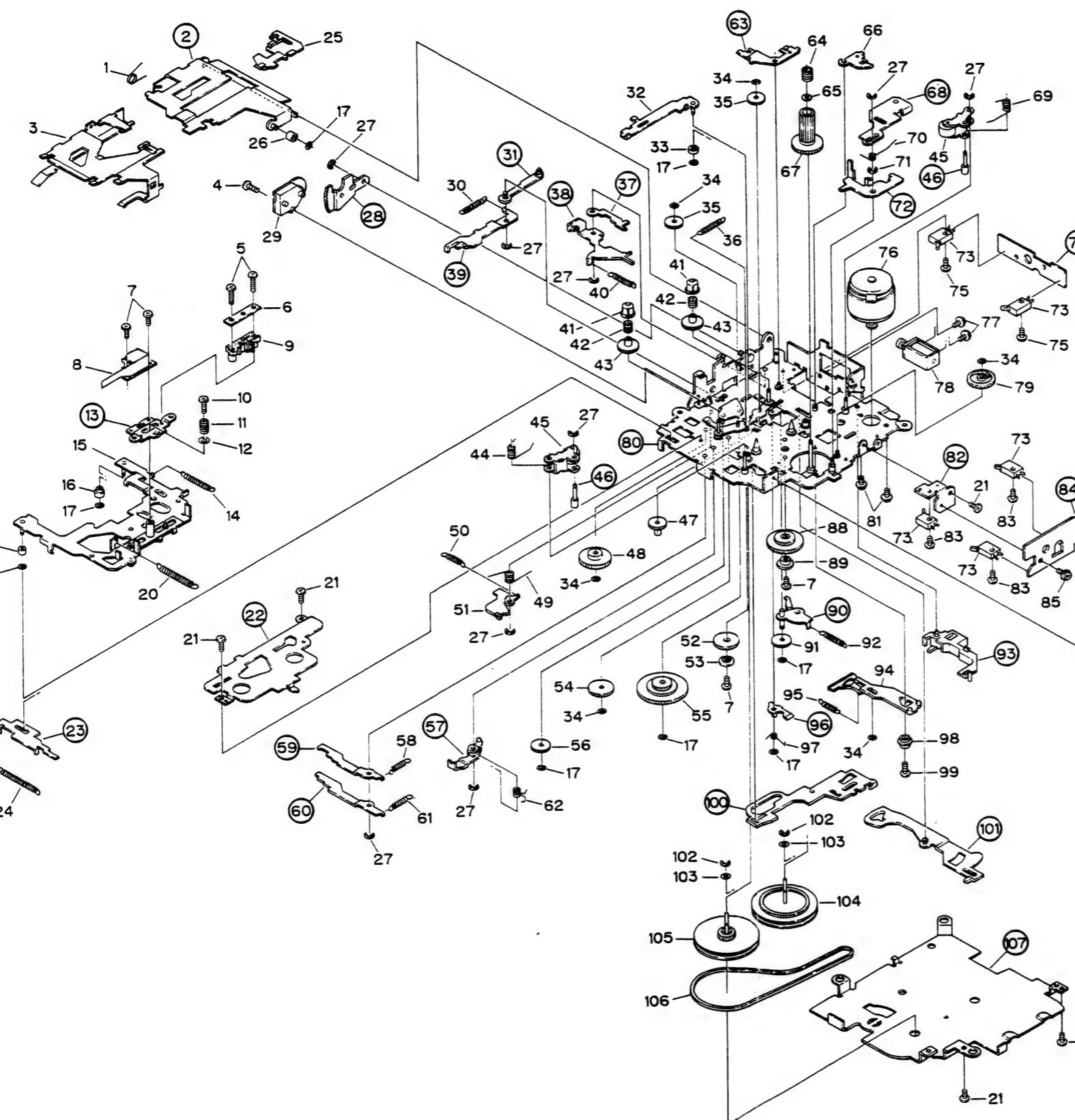


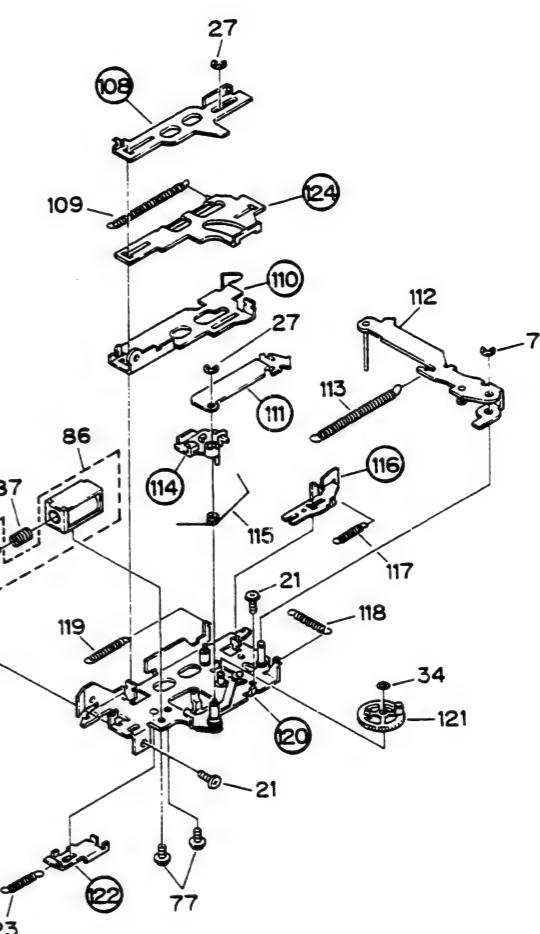
Fig. 18

14. CASSETTE MECHANISM ASSY EXPLODED VIEW

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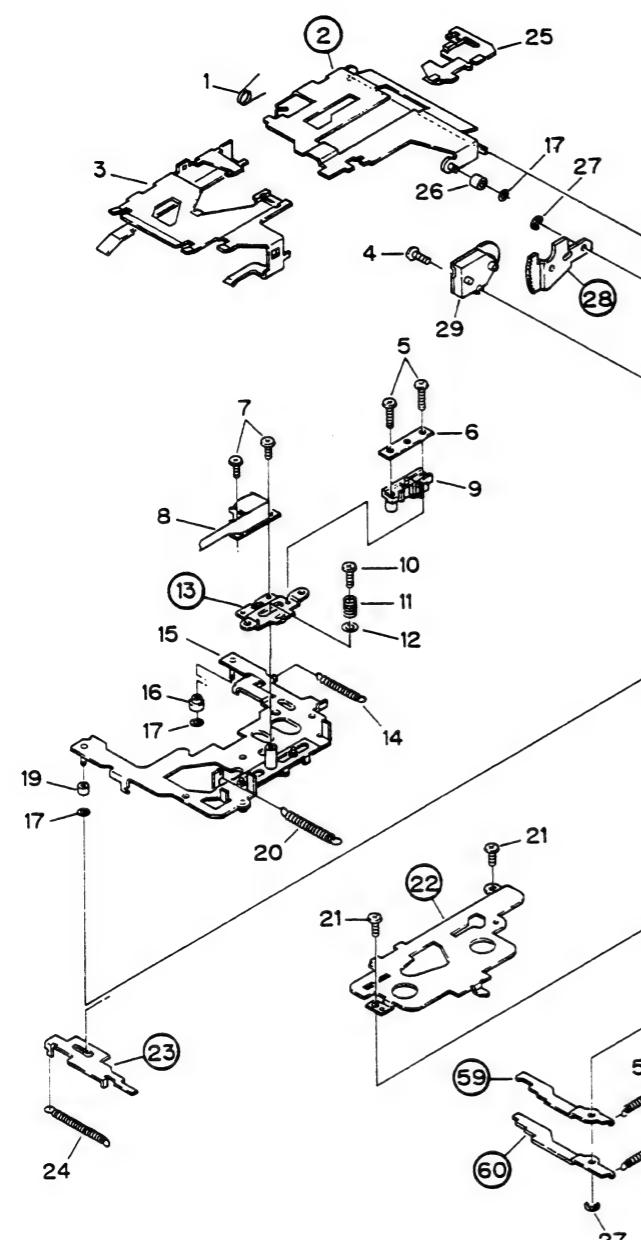


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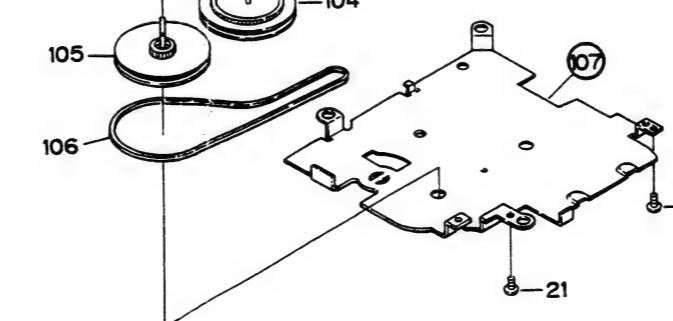
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C

C



D

D

• Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Spring	EBH1121	41	Collar	ENV1117
2	Arm Unit	EXA1132	42	Spring	EBH1155
3	Cassette Holder	ENC1165	43	Gear	ENV1116
4	Screw	CBA1070	44	Spring	EBH1190
5	Screw	EBA1016	45	Pinch Roller Unit	EXA1043
6	Spring	EBL1011	46	Shaft	ELA1129
7	Screw	HBA-175	47	Gear	ENV1113
8	Head Unit	EXA1084	48	Gear	ENV1111
9	Spacer	ENV1136	49	Spring	EBH1138
10	Screw	BMZ20P025FMC	50	Spring	EBH1142
11	Spring	EBH1145	51	Arm	ENV1138
12	Washer	EBE1005	52	Gear	ENV1109
13	Arm	ENC1155	53	Collar	ELA1161
14	Spring	EBH1187	54	Gear	ENV1110
15	Head Base Unit	EXA1115	55	Gear Unit	EXA1083
16	Roller	ELA1147	56	Gear	ENV1112
17	Washer	CBF1037	57	Arm Unit	EXA1075
18	.....		58	Spring	EBH2002
19	Roller	ELA1146	59	Arm	ENC1152
20	Spring	EBH1131	60	Arm	ENC1151
21	Screw	BMZ20P030FMC	61	Spring	EBH1136
22	Cover	ENC1166	62	Spring	EBH2003
23	Lever	ENC1159	63	Arm	ENC1149
24	Spring	EBH1183	64	Spring	EBH1182
25	Lever	ENV1124	65	Washer	HBF-120
26	Roller	ELA1148	66	Arm	ENV1121
27	Washer	YE15FUC	67	Gear	ENV1142
28	Arm	ENC1174	68	Lever Unit	EXA1078
29	Damper Unit	CXA3242	69	Spring	EBH1189
30	Spring	EBH2007	70	Spring	EBH1153
31	Lever Unit	EXA1079	71	Washer	YE20FUC
32	Lever Unit	EXA1074	72	Arm	ENC1150
33	Roller	ELA1149	73	Switch	CSN1005
34	Washer	CBF1038	74	P. C. Board	ENP1023
35	Gear	ENV1134	75	Screw	CBA-172
36	Spring	EBH1139	76	Motor Unit	EXA1089
37	Arm	ENC1170	77	Screw	PMS20P022FUC
38	Arm	ENC1148	78	Solenoid	EXP1009
39	Arm	ENC1147	79	Gear	ENV1106
40	Spring	EBH1186	80	Chassis Unit	EXA1131

Mark No.	Description	Part No.	Mark No.	Description	Part No.
81	Screw	PMS20P025FMC	106	Belt	ENT1014
82	Bracket	ENC1163	107	Cover	ENC1167
83	Screw	CBA1070	108	Lever	ENC1164
84	P. C. Board	ENP1021	109	Spring	EBH1147
85	Screw	CBA1076	110	Lever	ENC1160
86	Solenoid	EXP1004	111	Arm	ENC1156
87	Spring	EBH1157	112	Arm Unit	EXA1111
88	Gear	ENV1108	113	Spring	EBH1135
89	Collar	ELA1151	114	Clamper	ENV1141
90	Arm Unit	EXA1076	115	Spring	EBH1151
91	Gear	ENV1114	116	Lever	ENC1171
92	Spring	EBH1141	117	Spring	EBH1149
93	Clamper	ENV1140	118	Spring	EBH1146
94	Arm Unit	EXA1090	119	Spring	EBH1148
95	Spring	EBH1169	120	Guide Unit	EXA1100
96	Arm	ENC1153	121	Gear	ENV1118
97	Spring	EBH1140	122	Arm	ENC1157
98	Collar	ELA1162	123	Spring	EBH1158
99	Screw	JFZ20P045FNI	124	Lever	ENC1161
100	Lever	ENC1158			
101	Arm Unit	EXA1099			
102	E Type Washer	CBG1003			
103	Washer	HBF-179			
104	Flywheel	ENV1128			
105	Flywheel	ENV1127			

15. PACKING METHOD

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.

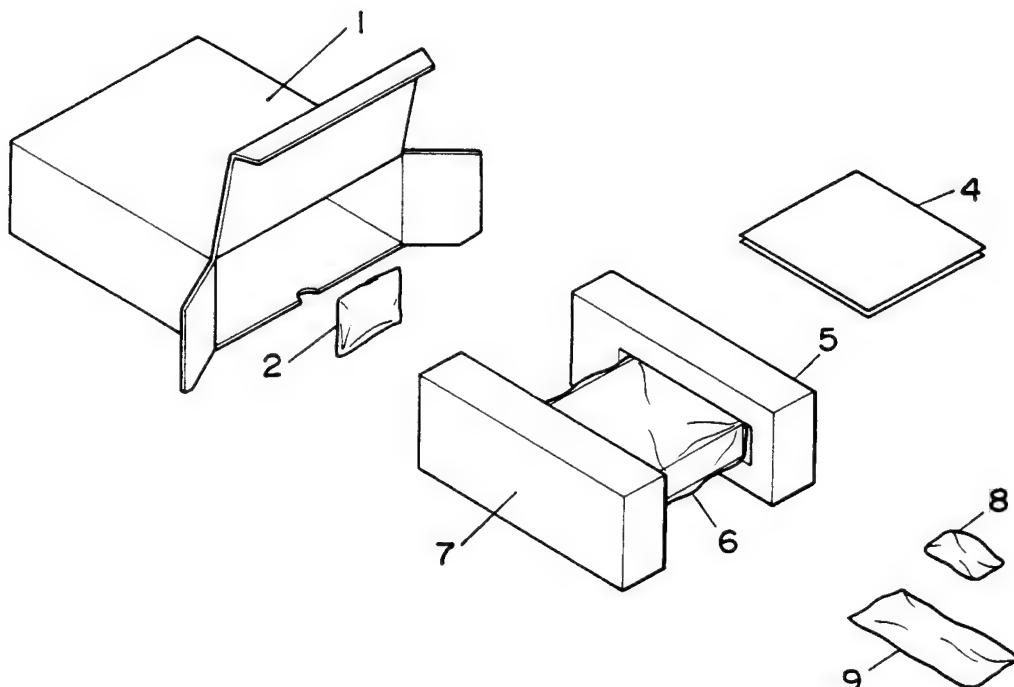


Fig. 20

• Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Carton (WG)	CHG1985	7	Styrofoam (L)	CHP1216
	Carton (EW)	CHG1984	8-1	Battery (EW)	CEX1006
2	Remote Control Assy (EW)	CXA2958	8-2	Fastener (EW) (Rough Surface)	CNM1716
2-1	Cover (EW)	CZN3224	8-3	Fastener (EW) (Soft Surface)	CNM1717
3	.....		9	Accessory Assy	CEA1209
* 4-1	Owner's Manual (WG)	CRD1477	9-1	Cord (×1)	CDE1289
	Owner's Manual (EW)	CRD1475	9-2	Bush (×1)	CNV1009
	Owner's Manual (EW)	CRD1476	9-3	Strap (×1)	CNF-111
4-2	Caution Card		9-4	Screw (×1)	CBA-102
4-3	Caution Card (WG)		9-5	Screw (×1)	CBA1002
4-4	Card		9-6	Nut (×2)	NF50FMC
4-5	Passport (WG)				
5	Styrofoam (R)	CHP1217			
6	Cover	CEG1092			

* 4-1 Owner's Manual

Part No.	Model	Language
CRD1477	KEH-M5002SDK/WG	German, French
CRD1475	KEH-M5002B/EW	English, French, German, Spanish
CRD1476	KEH-M5002B/EW	Swedish, Norwegian, Dutch, Finnish, Italian

16. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S □□□J, RS1/10S □□□J

Chip Capacitor (except for CQS....)

CKS...., CCS...., CSZS....

Tuner Amp Unit
Consists of
• Mother P.C. Board
• Dolby NR P.C. Board
• Amp P.C. Board

Unit Number :

Unit Name : Tuner Amp Unit (KEH-M5002SDK/WG)

MISCELLANEOUS

Mark =====	Circuit Symbol & No.	==== Part Name	Part No.	Mark =====	Circuit Symbol & No.	==== Part Name	Part No.
IC 302		HA12134		D 559			RD2R7ESB2
IC 501		LC7218HS		D 605 607			HZS9R1JB2
IC 551 552		TA8215L-A		D 606			RD4R7JSB1
IC 601		KHA255E		D 703			ISS277
IC 602		UPC4570C		D 704			ERA15-02VH
IC 701		PD4190		D 705			HZS7LC3
IC 702		S-8053ANO		D 708			HZS7LC2
IC 703		AN6540		D 711 714 715 716 717 718 720 723			ISS133
IC 802		KHA02		L 501	Ferrri-Inductor		LAU2R2M
IC 851		KHA158		L 502	Ferrri-Inductor		LAU8R2M
Q 501 516		2SC3113		L 701	Ferrri-Inductor		LAU101X
Q 503 505 514 616 713 716 717 724 726 727		DTC144ES		IB 501			CWW1272
Q 504 506 510 512 515 609 610 617 618		2SC3311A		IB 701			CWW1273
Q 507 718 723 741		2SB1243		IB 702			CWW1274
Q 508 509		2SA1150		IB 703			CWW1277
Q 511 611 614 701 719 740 801		2SD1859		IB 704			CWW1128
Q 513		2SK330		IB 705			CWW1276
Q 551 552 553 554		DTC343TS		IB 707			CWW1049
Q 555 556		2SA1048		X 501	Crystal Resonator		CSS1030
Q 601 602		DTC143TS		X 701	Crystal Resonator		CSS1023
Q 603 604 605 606		DTC363TS		X 801	Ceramic Resonator		CSS1019
Q 612		DTC143ES		VR 303 304	Semi-fixed 33kΩ (B)		CCP-381
Q 702		2SB945		BZ 502	Buzzer		CPV1006
Q 703 704 707 742 802		2SC3311A		FU 701	IC Protector		ICP-N20
Q 711 712 714 715		DTB123ES			FM/AM Tuner Unit		
Q 722		DTA143ES					
Q 725		DTA114ES					
Q 750		DTA144ES					
D 501		HZS3R0EB2					
D 502		DAN209S					
D 504 554 555 556 557 608 621 622 650 702		ISS133		R 316			RD1/4PS183JL
D 505 701 725		HZS5R6JB2		R 317 318 523 577 623 624 644 722			RS1/10S223J
D 551 552 601 602 603 623		DAP209S		R 501 522 524 533 534 537 721 757 758 759			RS1/10S222J
D 553		ERC04-02FE3		R 502			RD1/4PS104JL
D 558		HZS7R5JB2		R 503 634			RS1/10S393J
				R 504 511 576 613 614 627 628 643			RS1/10S473J
				R 509 510 512 521 632			RS1/10S472J
				R 513 514 515 517 529 530 532 535 543			RS1/10S102J
				R 518 742 743 763 764 765 780 781			RS1/10S681J
				R 519 527			RS1/10S152J

Mark =====	Circuit Symbol & No.	==== Part Name	Part No.
R 520 536 571 633		RS1/10S104J	
R 526 572 573 635 636 637 707 802		RS1/10S103J	
R 528 538 702		RD1/4PS472JL	
R 531 575 807		RS1/10S471J	
R 539		RS1/10S221J	
R 540 735		RS1/10S474J	
R 541		RS1/10S153J	
R 542		RS1/10S183J	
R 551 552 561 562		RS1/10S392J	
R 553 554 563 564 603 604 733		RS1/10S182J	
R 555 556 565 566		RS1/10S471J	
R 557 558 559 560 567 568 569 570		RD1/4PS4R7JL	
R 574 607 608 609 610 611 612		RS1/10S102J	
R 601 602		RS1/10S822J	
R 605 606 615 616 625 626		RS1/10S203J	
R 621 622		RS1/10S113J	
R 631 642 732 736 751 752 753 754 755		RS1/10S102J	
R 639		RD1/4PS471JL	
R 701		RD1/4PS270JL	
R 703		RD1/4PS220JL	
R 704		RD1/4PS152JL	
R 705 794		RD1/4PS331JL	
R 706 714 725 729 803		RS1/10S472J	
R 708 709 710 715 737 740 741 744 749		RS1/10S473J	
R 723 745 746 747 748 750 801		RD1/4PS102JL	
R 724		RD1/4PS272JL	
R 726		RD1/4PS473JL	
R 728		RS1/10S124J	
R 730		RS1/10S272J	
R 760 761 762 805		RS1/10S222J	
R 766 767		RS1/10S682J	
R 768 769 770 771 782 783 784 804		RS1/10S473J	
R 785 786		RD1/4PS130JL	
R 793		RS1/10S0R0J	

CAPACITORS

Mark =====	Circuit Symbol & No.	==== Part Name	Part No.
C 328 329 332		CEA010M50LS2	
C 330 331 804		CEAR33M50LS2	
C 333 334 557 558 559 560 569 570 571 572		CQEA224J63	
C 335 623 626 851 852 853 854		CEA101M10LS	
C 336 514 519 704 705 707 801 802		CEA220M16LS	
C 501 708 711 720		CKSQYF473Z25	
C 502 503 504 506 507 508 509 510 511 512		CKSQYB103K50	
C 505		CKSQYB681K50	
C 513 605 606 613 614 624		CEA100M16LS2	
C 515		CEAR47M50LS2	
C 516		CKSQYB223K25	
C 517 520 580 581 803		CKSQYB103K50	
C 518 549 553 554 565 566		CKSQYB102K50	
C 521	4.7 μ F/16V	CCH1005	
C 522 523		CCSOCH270J50	
C 551 552 563 564		CEHAS4R7M35	
C 555 556 567 568 576		CEHAS470M16	
C 561 573	220 μ F/10V	CCH1095	
C 562 574		CEHAQ471M16	
C 575		CKSQYB472K50	

Mark =====	Circuit Symbol & No.	==== Part Name	Part No.
C 577			CEHAS100M16
C 601 602			CEA3R3M50LS
C 603 604 607 608 806			CEA4R7M5LS
C 615 616 617 618			CEA100M16LS2
C 621			CEA101M10L2
C 622 627 805			CEA470M16LS
C 625			CEA221M10L2
C 628			CEA100M16LS2
C 651 652			CCSQSL101J50
C 701 702			CEA220M16L2
C 703	3300 μ F/16V		CCH1037
C 709			CEA010M50L2
C 710	220 μ F/10V		CCH1015
C 712			CEA2R2M50LS2
C 713			CCSQCH090D50

Tuner Amp Unit (KEH-M5002B/EW)

Symbol & No.	KEH-M5002SDK/WG	KEH-M5002B/EW
	Parts No.	Parts No.
IC802	KHAC02	.....
Q502	.....	DTC144ES
Q603, 604, 605, 606	DTC363TS	.....
Q617, 802	2SC3311A	.....
Q801	2SD1859	.....
D602, 603	DAP209S	.....
D720	ISS133	.....
X801	CSS1019	.....
R643, 804	RS1/10S473J	.....
R644	RS1/10S223J	.....
R755	RS1/10S102J	.....
R801	RD1/4PS102JL	.....
R802	RS1/10S103J	.....
R803	RS1/10S472J	.....
R805	RS1/10S222J	.....
R807	RS1/10S471J	.....
C801, 802	CEA220M16LS	.....
C803	CKSQYB103K50	.....
C804	CEAR33M50LS2	.....
C805	CEA470M16LS	.....
C806	CEA4R7M35LS	.....
C807	CQEAE83J50	.....

Unit Number :
Unit Name : FM/AM Tuner Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
IC 51		LA1140B	
IC 101		KHA1201	
IC 201		PA4010	
Q 1 203 205	Chip Transistor	DTC124EK	
Q 51 202	Chip Transistor	ZSC2712	
Q 71	Chip Transistor	2SJ106	
Q 201		2SK435	
D 201 202 203 204		ISS133	
D 205	Variable Capacitance Diode	SVC203-W1	
L 51	Inductor	LAU150K	
L 201	Inductor	CTF1084	
L 203	Ferri-Inductor	LAU220K	
L 204	Ferri-Inductor	LAU470K	
L 205	Ferri-Inductor	LAU4R7K	
L 206	Ferri-Inductor	CTF-157	
T 51	Coil	CTE1021	
T 52	Coil	CTE1022	
T 201	Coil	CTB1020	
T 202	Coil	CTB1004	
T 203	Coil	CTB1040	
T 204	Coil	CTE1037	
T 205	Coil	CTE1038	
T 206	Coil	CTE1039	
CG 1	Surge Protector	DSP-201M	
CF 51	Ceramic Filter	CTF-182	
CF 201	Ceramic Filter	CTF1041	
CF 202	Filter	CTF1085	
X 201	Crystal Resonator	CS51057	
VR 53	Semi-fixed 150kΩ (B)	VRTB4VS154	
VR 152	Semi-fixed 6.8kΩ (B)	VRTB4VS682	
VR 153	Semi-fixed 10kΩ (B)	VRTB4VS103	
	FM Front End	CWB1037	

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
R 5 210		RS1/10S682J	
R 6 131		RS1/10S102J	
R 7 58 152		RS1/10S223J	
R 8 10		RS1/10S152J	
R 9		RD1/4PS151JL	
R 52		RS1/10S331J	
R 53 57 204 213		RS1/10S473J	
R 54 103		RS1/10S333J	
R 55 60 215		RS1/10S153J	
R 56		RS1/10S123J	
R 59		RS1/10S183J	
R 61 62 77 101		RS1/10S472J	
R 75		RS1/10S474J	
R 102		RS1/10S392J	
R 156 157		RS1/10S332J	
R 201		RS1/10S220J	
R 202		RS1/10S681J	
R 203 206 214		RS1/10S222J	
R 205 209		RD1/4PS470JL	
R 207		RS1/10S822J	
R 208 211 212		RS1/10S103J	

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
C 1 201	209 223 228		CKSQYB103K25
C 2	3		CKSQYB102K50
C 51	52 53 54 59 132 203 215 216 219		CKSQYF473Z50
C 55	62		CCSOSL330J50
C 56	63		CEAR47M50LS2
C 57			CKSYB683K25
C 58			CEA010M50LS2
C 60			CCSOSL101J50
C 61			CEA4R7M16NPLL
C 103			CEA150M16LS
C 105 224			CEA470M16LS
C 154			CKSQYB153K25
C 159 160			CKSQYB183K25
C 161			CEA101M10LS
C 202 212			CKSQYB332K50
C 204 208 210			CKSQYB8223K25
C 205			CCSQCH220J50
C 206 207			CCSQCH20J50
C 211			CEA2R2M50LS2
C 213			CCSQCH470J50
C 218			CEA2R2M35NPLL
C 220			CCSQCH430J50
C 221			CCSQCH100D50
C 222			CSZA010K35L
C 225			CKSQYB333K25
C 226			CKSQYF473Z50
C 227			CEA47M16LS
C 229			CEA220M16LS
C 230			CKSQYB471K50
Unit Number :			
Unit Name :			Mechanism Control Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
IC 1			BA3430FS
Q 1 2		Chip Transistor	2SC4116
Q 3 5 7		Chip Transistor	2SB1441JU
Q 4 6		Chip Transistor	2SC3295
RESISTORS			
Mark	Circuit Symbol & No.	Part Name	Part No.
R 1	2 3 4		RS1/10S104J
R 5 6 13			RS1/10S181J
R 7 8			RS1/10S334J
R 9 10			RS1/10S133J
R 11 12			RS1/10S183J
R 14			RS1/10S270J
R 15			RS1/10S823J
R 16 21 26 31			RS1/10S473J
R 17			RS1/10S333J
R 18 19			RS1/10S224J
R 20 24 25 29 35			RS1/10S103J
R 22 23 27 28 32 33 34			RS1/8S221J
R 30			RS1/10S472J

CAPACITORS

Mark	Circuit Symbol & No.				Part Name	Part No.
C	1	2	3	4		CKSQYB681K50
C	5	6			22 μF/6.3V	CCH1065
C	7	8	14			CKSQYB103K50
C	9					CKSQYB152K50
C	10	12				CKSYB104K25
C	11				6.8 μF/25V	CCH1066
C	13				100 μF/6.3V	CCH1067
C	15	16			4.7 μF/25V	CCH1064

Unit Number :
Unit Name : Display Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.				Part Name	Part No.						
IC	901					LC7582A						
IC	902					BX-1393						
S	1	2	3	4	5	6	7	8	9	10	Switch	CSG-255
S	11	12	13	14	15	16	17	18	19	20	Switch	CSG-255
S	21	22	23								Switch	CSG-255
IL	1	2	3		Lamp	14V 40mA	CEL1013					
IL	4	5	6	7	Lamp	14V 40mA	CEL-147					
IL	8	9			Lamp	8V 60mA	CEL1137					
IL	10	11			Lamp	8V 60mA	CEL1116					
IL	12	13			Lamp	8V 60mA	CEL1115					
					LCD		CAW1061					
R	901	902	903	904			RS1/10S102J					
R	905						RS1/10S104J					
R	906						RS1/10S470J					
C	901						CKSQYB223K25					
C	902						CCSQCH331J50					
C	903						CEA470M6R3LS					

Unit Number :
Unit Name : Connector P.C. Board

Mark	Circuit Symbol & No.				Part Name	Part No.
D	1	2				F1SR35-100A
S	1	2	3		Switch(LOAD, END, F/R)	CSN1005

Unit Number :
Unit Name : Switch P.C. Board

Mark	Circuit Symbol & No.				Part Name	Part No.
S	1	2			Switch(METAL, PLATE)	CSN1005

Miscellaneous Parts List

Mark	Circuit Symbol & No.				Part Name	Part No.
S	602		Switch(O/R)			CSN-078
HD	1		Head Unit			EXA1084
M	1		Motor Unit			EXA1089
SO	1		Solenoid			EXP1009
SO	2		Solenoid			EXP1004



Service Manual

ORDER NO.
CRT1276

CASSETTE MECHANISM ASSEMBLY

CX-175

NOTE

- This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for the model under repair.

Model	Service Manual	Cassette Mechanism Assembly
KEH-M5000SDK/WG KEH-M5000B/EW KEH-M5000QR/ES	CRT1236	EXK1410
KEH-M5001B/XIB	CRT1238	EXK1410
KEH-M5000QR/UC	CRT1272	EXK1410
KEH-8100SDK/WG KEH-8100B/EW KEH-8101B/XIB KEH-8150QR/ES KEH-8100QR/US	CRT1264	EXK1410
KEH-5000ZRN/XIB	CRT1286	EXK1410
KEH-M7000SDK/WG KEH-M7000B/EW	CRT1235	EXK1420
KEH-M7000QR/UC	CRT1237	EXK1420

Model	Service Manual	Cassette Mechanism Assembly
KEH-M7001B/XIB	CRT1238	EXK1420
KEH-M7000QR/CA	CRT1244	EXK1420
KEH-700QR/US KEH-8150QR/CA	CRT1264	EXK1420
KEX-M800SDK/WG KEX-M800/EW, ES, UC	CRT1234	EXK1430
KEX-M801/XIB	CRT1238	EXK1430

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1. DISASSEMBLY

Note: Always use new washer and E washer at the time of reassembling.

• Dismounting the Cassette Holder

1. Remove the three springs.
2. Take off E washer, and then remove the arm unit.
3. Make the claw straight.
4. Shift the cassette holder toward the left and pull it out from above.

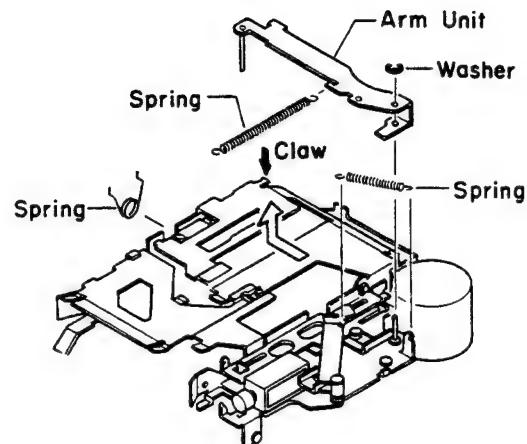


Fig. 1

• Dismounting the Head Unit

1. Remove the two screws, and then remove the guide assy.
2. Remove the two screws, and then remove the head unit.

• Dismounting the Pinch Roller Unit

1. Remove the spring and then remove the pinch roller unit

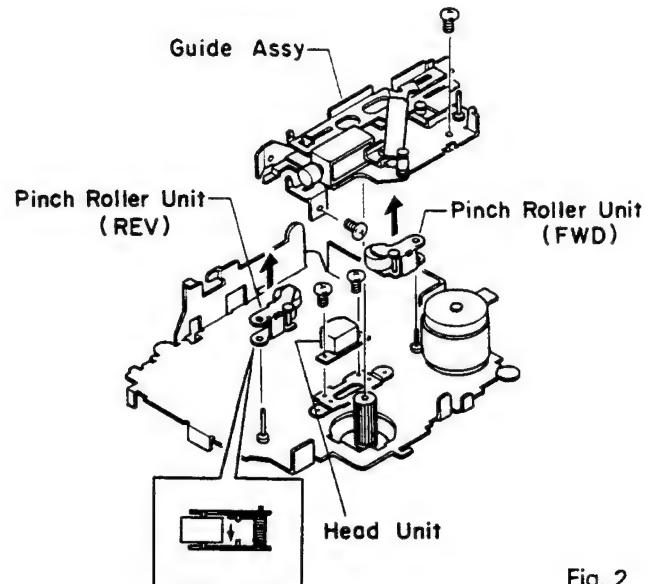


Fig. 2

• Dismounting the Gear (Reel Base)

1. Remove the two screws, and then remove the cover.
2. Remove the collar, and then remove the spring and gear.

When removing the collar be careful not to damage the claw on the inside of the collar.

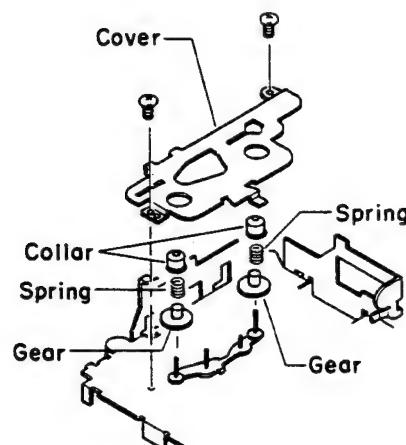


Fig. 3

• **Dismounting the Flywheels**

1. Remove the two screws, and then remove the cover.
2. Take off E washer. Retain washer properly to ensure it doesn't get lost.
3. Remove the flywheels. Do not mistake the N and R flywheels.

• **Dismounting the Motor Unit**

1. Remove the two screw, and then remove motor unit.

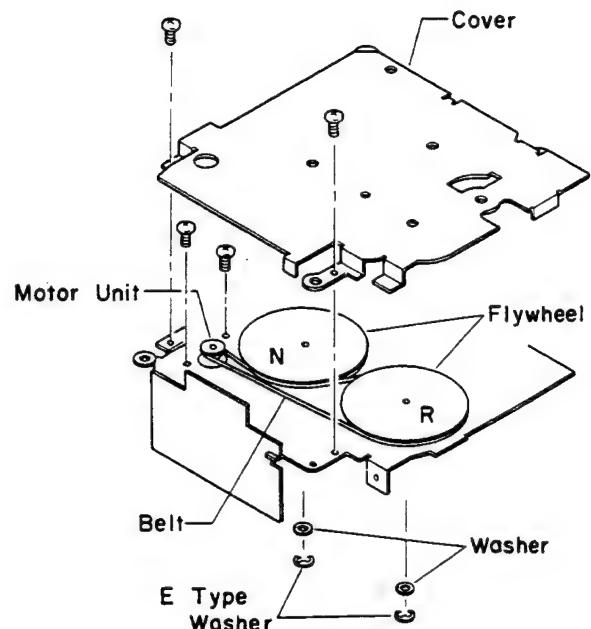


Fig. 4

2. ADJUSTMENT

2.1 AZIMUTH ADJUSTMENT

• **To Adjust**

1. Play "A" side of NCT-110 (10 kHz, -10 dB). Adjust each screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

2.2 TAPE SPEED ADJUSTMENT

• **To Adjust**

1. Reproduce NCT-111 (3 kHz, -10 dB). Adjust the semifixed resistor so that frequency counter shows 3,010 Hz (+80 Hz, -40 Hz).

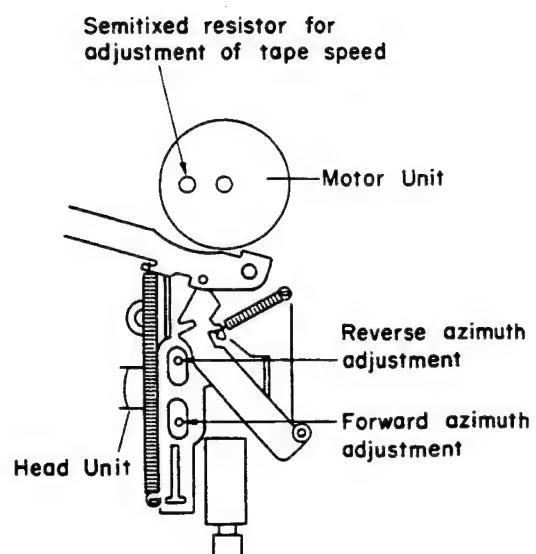


Fig. 5

2.3 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<ul style="list-style-type: none"> ■ Tape speed deviation: 3,000 $\frac{+90}{-30}$ Hz (4.76cm/s $\frac{+3}{-1}$ %) <p>Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.</p>	<ul style="list-style-type: none"> ■ Wow and flutter: Less than 0.18% (WRMS) <p>Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.</p>
<ul style="list-style-type: none"> ■ Fast forward and rewinding time: 95—115 seconds <p>Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.</p>	<ul style="list-style-type: none"> ■ Winding torque: 37—63g·cm <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 — 6 seconds.</p>	<ul style="list-style-type: none"> ■ F.F. torque: 70—110g·cm <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<ul style="list-style-type: none"> ■ REW torque: 70—110g·cm <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<ul style="list-style-type: none"> ■ Back tension torque: 0.5—5 kg <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<ul style="list-style-type: none"> ■ Cassette loading force: Less than 0.5 kg <p>Push the center of the cassette and measure the force with a tension meter (3 kg).</p>

3. MECHANISM DESCRIPTION

- Parts Location

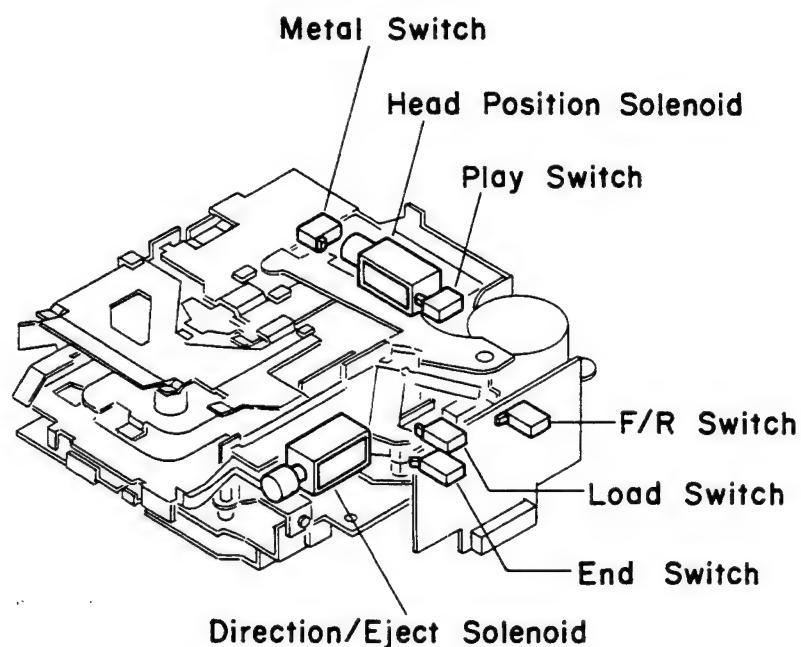


Fig. 6

- Switch Mode

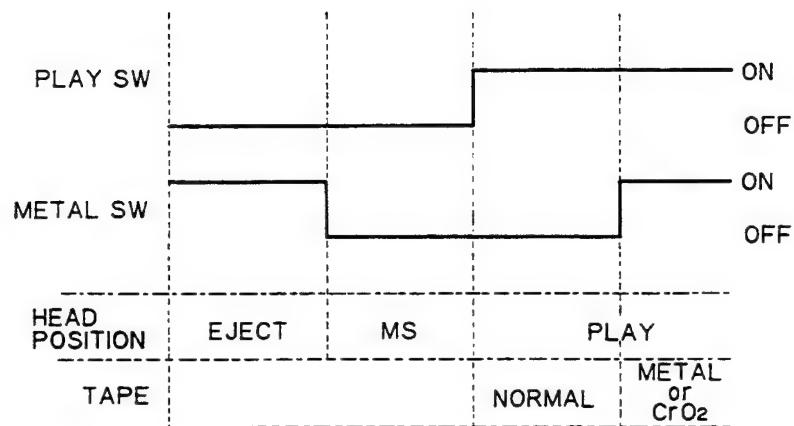


Fig. 7

• ATSC Operation

- (1) Loading of a tape cassette causes an arm unit to turn, which causes the load switch to turn ON. With the load switch ON, a motor runs to cause all gears other than FF/REW idler gears to mesh and forward and reverse idler gears rotate in the respective play direction. Now the ATSC state is obtained (Figs. 8 and 9).

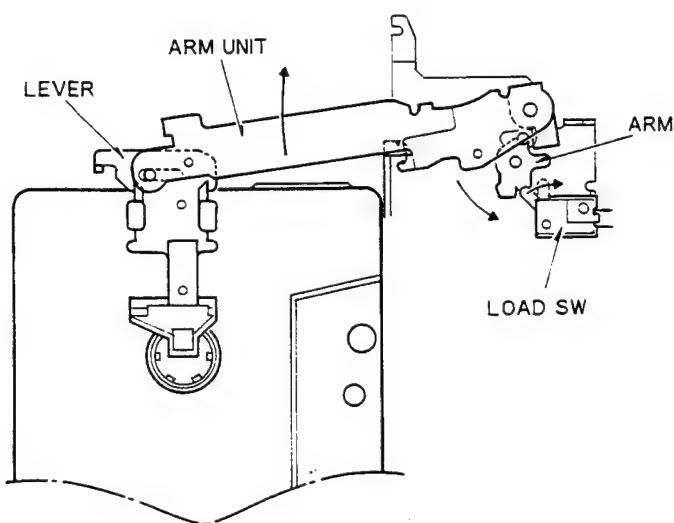


Fig. 8

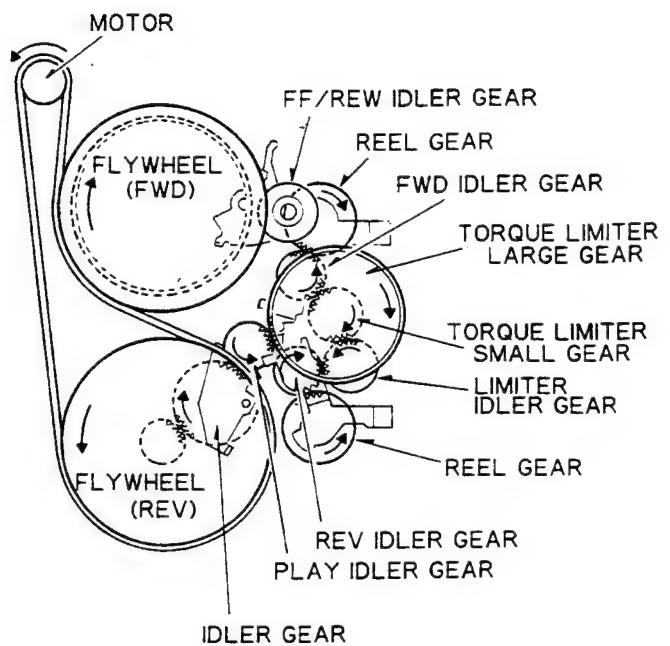


Fig. 9

• Sensing Operation

- (1) Sensing arm (felt) and torque limiter bush are held together by means of a sensing arm spring. The felt slides with the torque limiter bush side to keep Point A as a fulcrum at all times while the sensing arm moves along a cam of sensing cam gear because the arm tries to turn counterclockwise. (Fig. 10)
- (2) the torque limiter bush stops rotation at ATSC or tape end, and a pin of sensing arm is pushed toward the outermost side by the sensing cam gear. Frictional force between the felt and bush helps the sensing arm holding its position. (Fig. 11)

- (3) When the sensing cam gear is turned further, with the sensing arm held in a state shown in Fig. 11, the sensing arm pin is caught by a hook of the cam gear. (Fig. 12)
- (4) The sensing cam gear turns further from the state shown in Fig. 12, and the sensing arm moves to turn ON the sensing switch. (Fig. 13)
- (5) With the sensing switch ON, the sensing cam gear turns further to release the sensing arm pin from the hook. The pin returns to an original position under a force of the sensing arm spring. (Fig. 14)

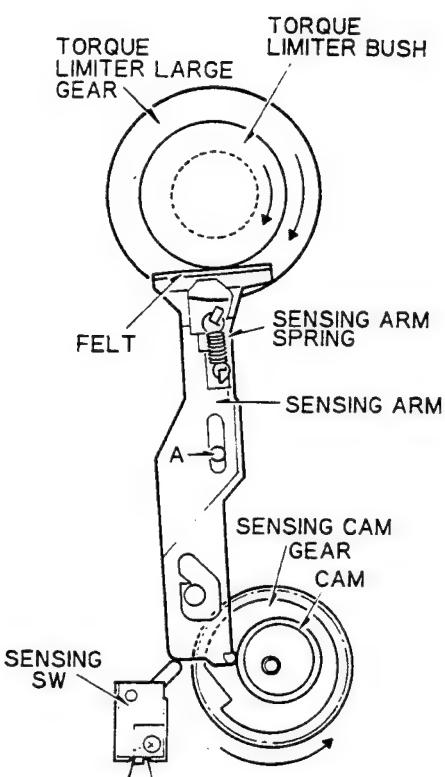


Fig. 10

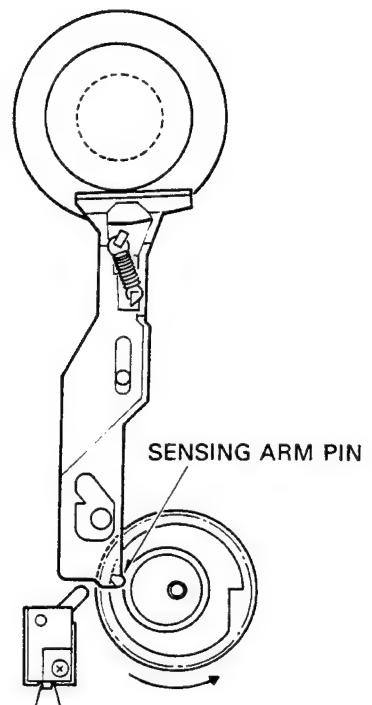


Fig. 11

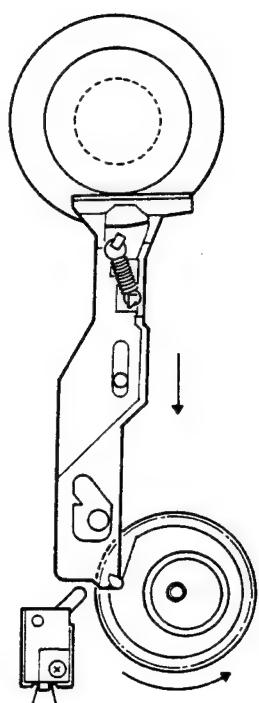


Fig. 12

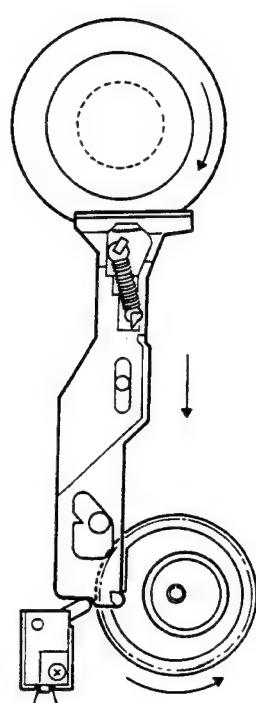


Fig. 13

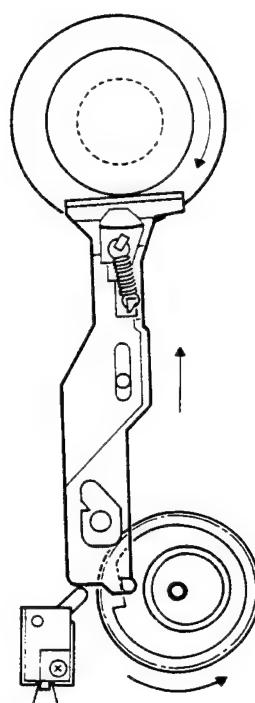


Fig. 14

• Heading Operation

- (1) A heading solenoid performs attraction in the A direction, causing a lock arm to turn clockwise via L arm, solenoid lever, and arm (A). The cam gear is unlocked. Notch of the cam gear meshes with the second-stage gear for counter-clockwise rotation. The arm (B) is driven clockwise to begin heading operation. In this heading operation, the arm (B) turns clockwise to cause a lever to move in the B direction.

A head base, which is connected with the lever via spring, operates simultaneously with spring. (Fig. 15)

- (2) Fig. 16 shows the state at end of heading operation.

The cam gear rotates to a full limit and the lock arm locks the cam gear. This locking is made to prevent the head base to move backward due to entry of the play lock arm while heading operation is under way.

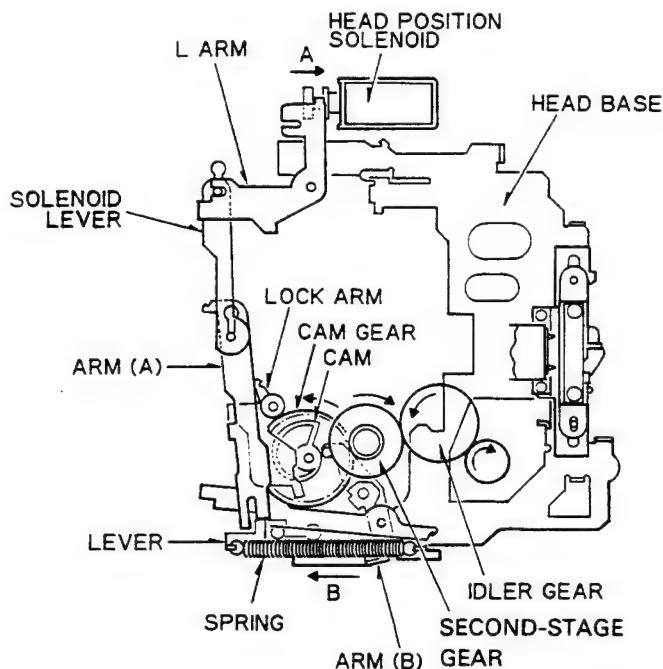


Fig. 15

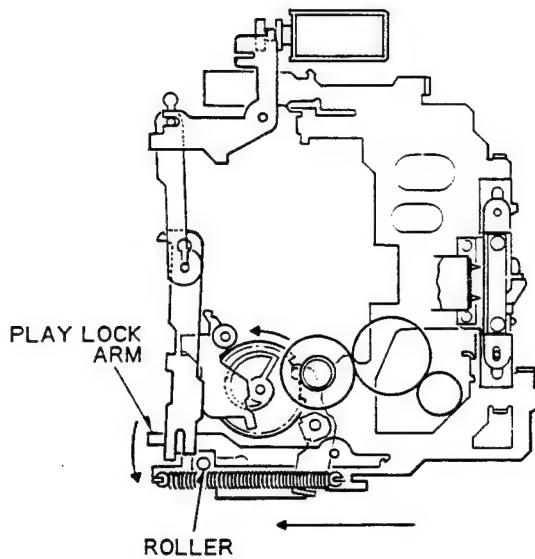


Fig. 16

• Playing Operation

- (1) FWD play is obtained when the REV idler gear is released from the limiter idler gear. (Fig. 17)
- REV play is obtained when the FWD idler gear is released from the torque limiter small gear. (Fig. 18)

FWD PLAY

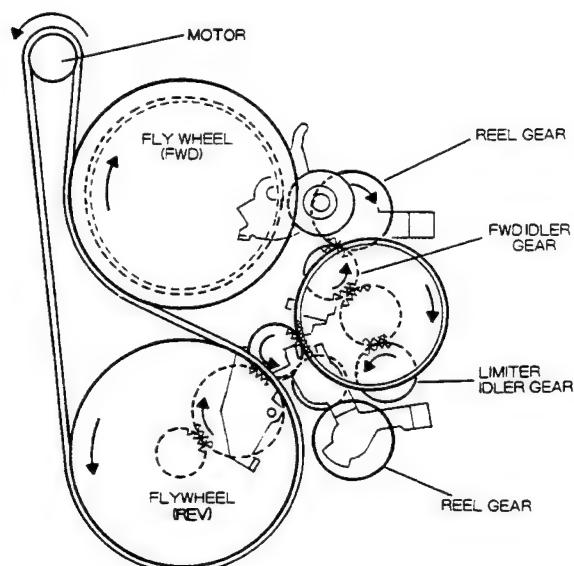


Fig. 17

REV PLAY

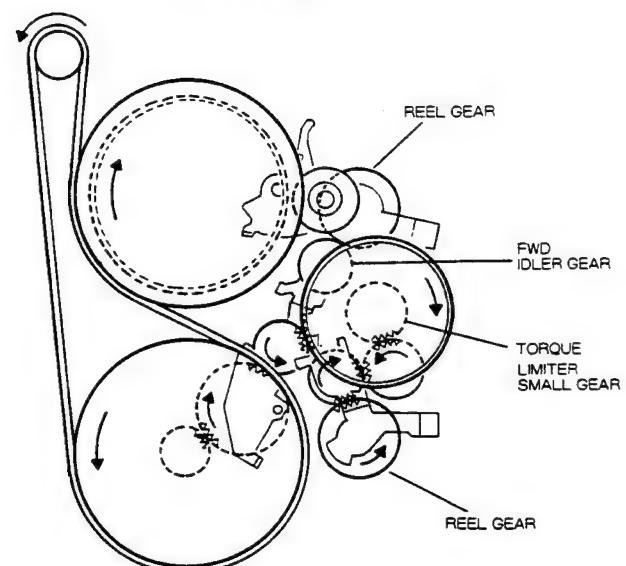


Fig. 18

• **Direction Change**

- (1) To change the tape running direction, pull the DIR (EJ) solenoid in the A direction to press the lock arm via solenoid arm to unlock the F/R gear.
- Notch meshes to cause counterclockwise rotation to move the F/R lever to the right.
- The F/R lever moves the F/R slide lever and F/R arm.
- The F/R slide lever performs pinch roller change-over by cam and F/R switch changeover (FWD→ON, REV→OFF).

The F/R arm moves FWD and REV idler plates via the F/R control lever in order to achieve changeover between FWD and REV idler gears.

Note that the F/R arm is connected with a head base, and the roller performs FWD and REV idler gears changeover because it is in the B section of F/R arm when the head is at PLAY or MS.

As the roller is in the C section of the F/R arm when the head is at the release (EJ) position, no change-over is made. In this state, both idler gears of FWD and REV mesh with each other. (Figs. 19 and 20)

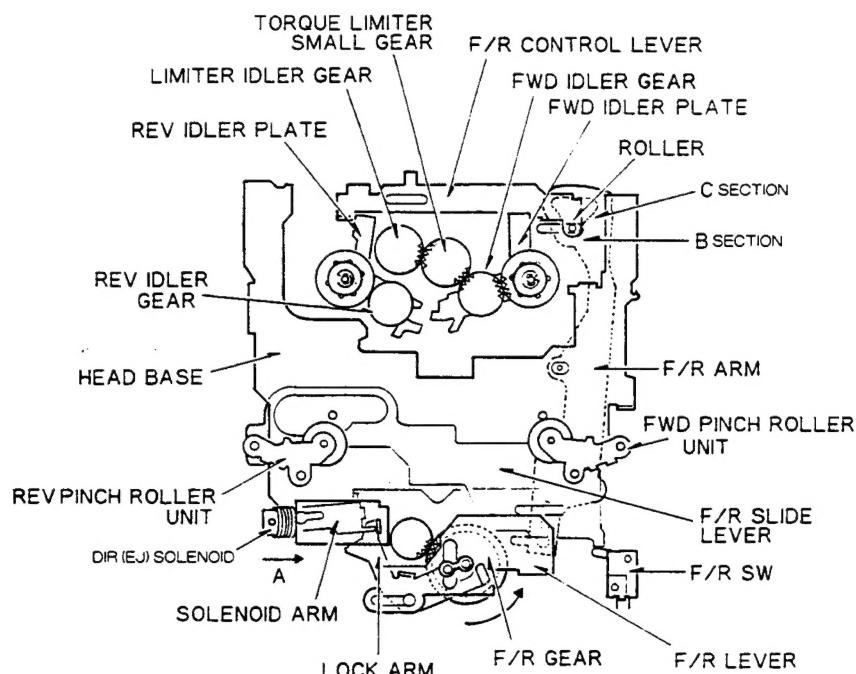


Fig. 19

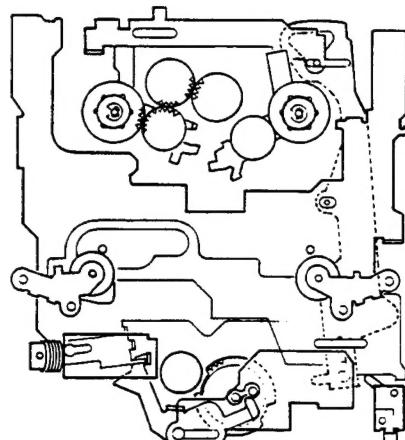


Fig. 20

• Head Position

- (1) Fig. 21 shows the play state. The heading solenoid is moved in the A direction from the play state to release the play lock arm via L arm, solenoid lever and arm (A).

The head base moves backward until locked with an MS lock arm under a force of return spring and enters the MS state.

PLAY

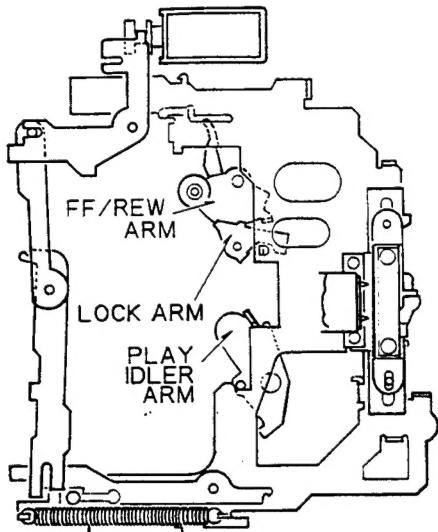


Fig. 21

- (2) The heading solenoid is moved in the A direction from the MS state to release the MS lock arm via L arm, solenoid lever, and arm (A).

The head base returns to the release position under a force of return spring.

The head base pushes back the FF/REW arm during return, releasing the FF/REW idler gear from the torque limiter.

The play idler arm is rotated counterclockwise by a cam of the head base to mesh the play idler gear with the torque limiter. (Fig. 23)

The head base rotates the lock arm at a head base bend section during return, thereby unlocking the FF/REW arm.

The FF/REW arm turns counterclockwise and stops at a specified position, allowing the FF/REW idler gear to mesh with flywheel and torque limiter.

The play idler arm turns clockwise to release the play idler gear from the torque limiter. (Fig. 22)

MS (FF/REW)

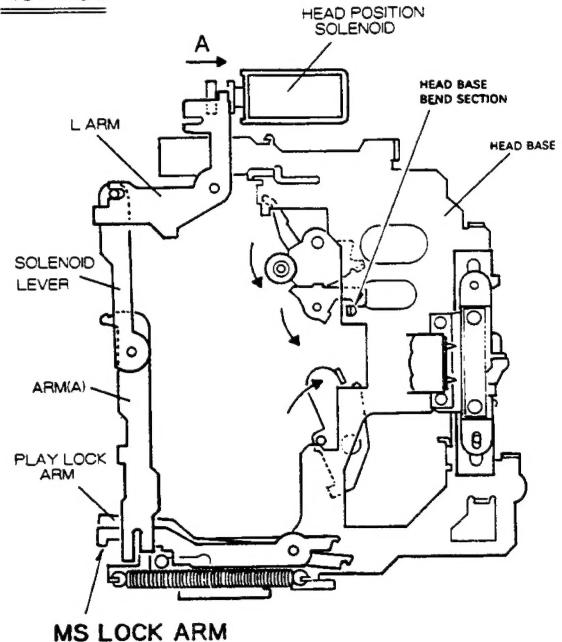


Fig. 22

RELEASE (EJ)

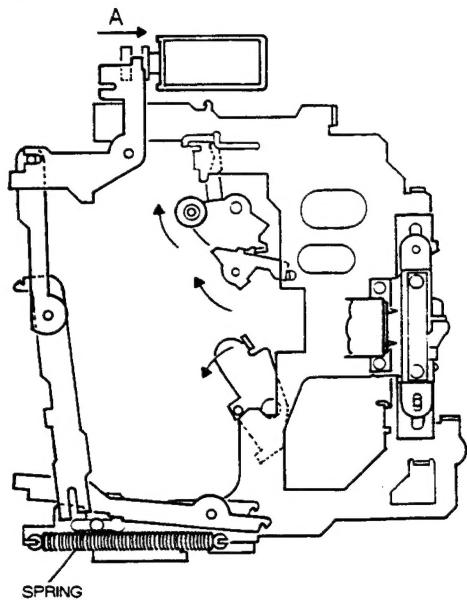


Fig. 23

• FF/REW Operation

(1) The play idler gear is released from the torque limiter large gear, and the FF/REW idler gear meshes.

When the REV idler gear is released, the FF state is obtained. The REV state is obtained when the FWD idler gear is released. (The state is opposite between FWD (PLAY) and REV (Reverse) in both cases.)

There are two (upper and lower) torque limiter large gears. Both two FF/REW idler gears mesh simultaneously during FF/REW to generate large torque. (Only one gear meshes during play.) (Figs. 24 and 25)

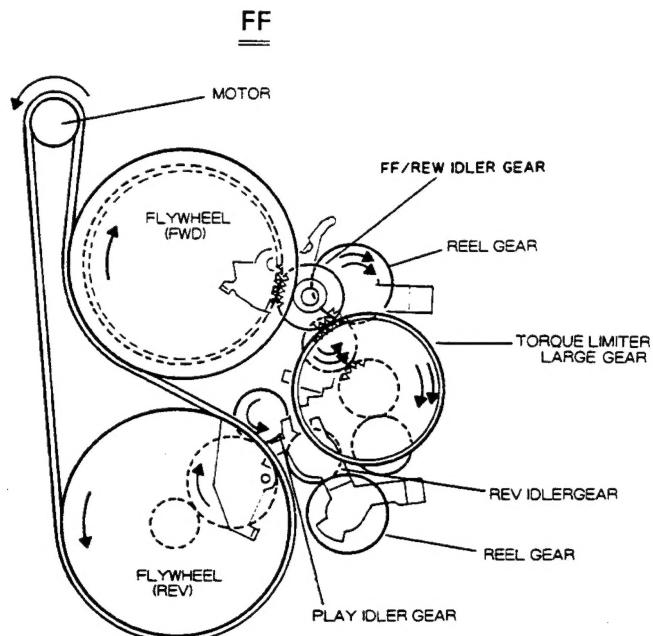


Fig. 24

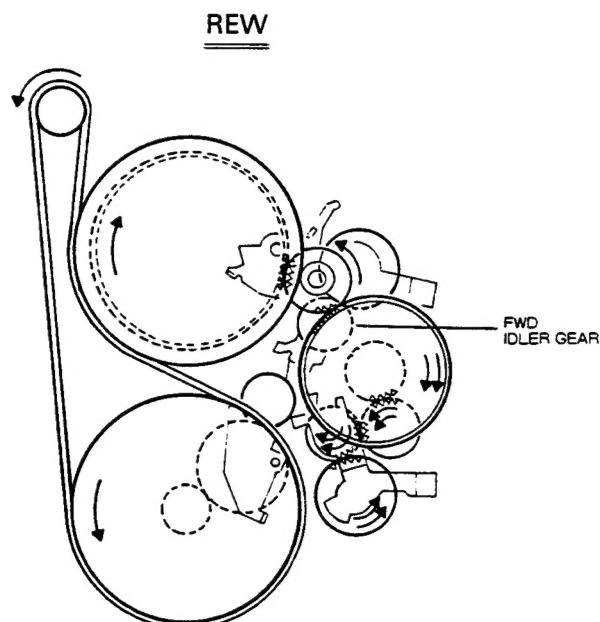


Fig. 25

• Eject Operation

(1) The EJ (DIR) solenoid performs attraction to operate the lock arm via solenoid arm, unlocking gear.

The gear then rotates counterclockwise to contact the lever (B) which is moved to the right.

The lever (A) is connected with the lever (B) via spring, and moves simultaneously to the right. A cam of the lever (A) pushes up a cassette arm and the lever (C) enters below a cassette arm roller to maintain the push-up height. (Fig. 26 ~ 28)

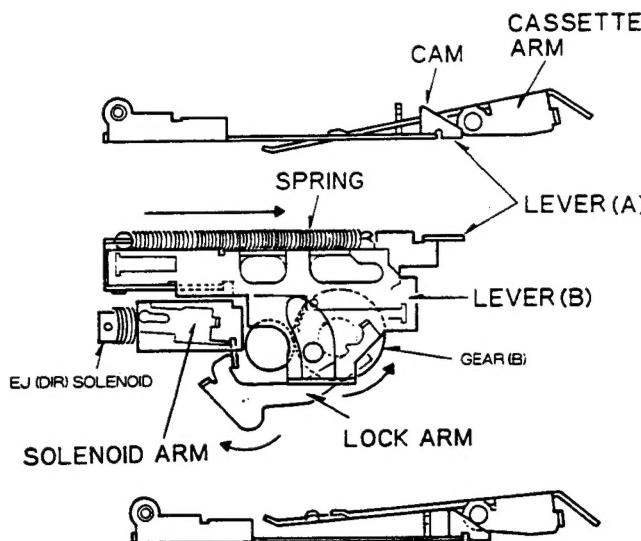


Fig. 26

(2) Upon completion of push-up of a tape cassette, the gear (B) pushes the lever (D) by roller to move it to the left. The lever (D) is connected with an arm unit via spring (D) and pushed out the tape cassette. (Figs. 29 and 30)

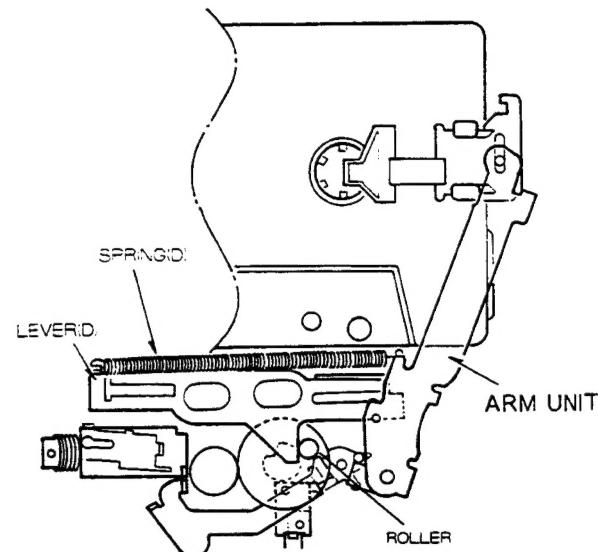


Fig. 29

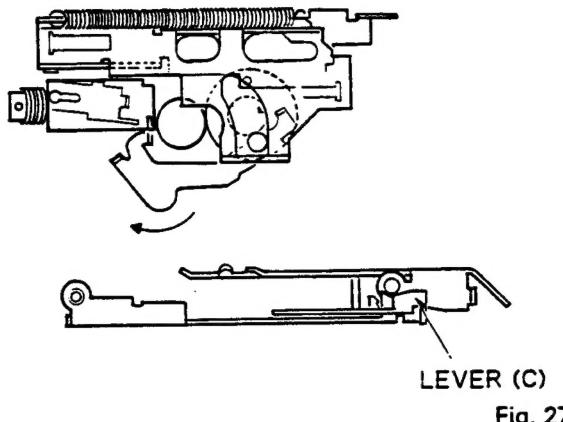


Fig. 27

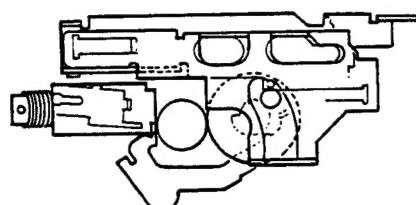


Fig. 28

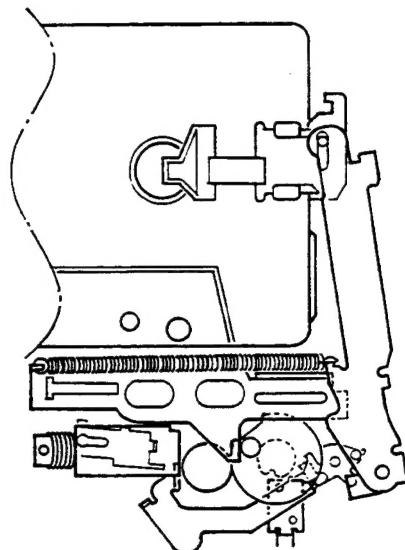


Fig. 30